PATENT ABSTRACTS OF JAPAN

(11)Publication number : 2001-126038

(43)Date of publication of application : 11.05.2001

(51)Int.Cl. G06K 17/00

G06F 3/00

G06F 13/12

H04L 29/06

H04L 27/00

(21)Application number : 11-310297

(22)Date of filing : 29.10.1999

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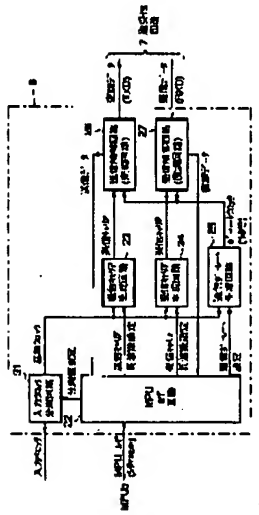
(54) READER WRITER AND COMMUNICATION CONDITION SETTING METHOD FOR THE SAME



(57)Abstract:

PROBLEM TO BE SOLVED: To give versatility corresponding to various communication conditions and to improve developing efficiency and maintenance efficiency.

SOLUTION: When power is supplied, an MPU I/F circuit 22 decides an initial communication mode as a communication protocol with MPU 5, receives communication condition information from MPU 5 through serial communication, and decodes received communication condition information. Then, it sets the frequency dividing value of an input clock frequency dividing circuit 21 based on the decoded communication condition, sets the transmission carrier frequency of a transmission carrier generation circuit 23, sets the reception carrier frequency of a reception carrier generation circuit 24, sets the communication baud rate of a communication baud rate generation circuit 25, receives information of the other modes from MPU 5 through serial communication, sets the other modes, validates whole setting and starts communication with a radio card.

LEGAL STATUS

[Date of request for examination]

[Date of sending the examiner's decision of rejection]

[Kind of final disposal of application other than the examiner's decision of rejection or application converted registration]

[Date of final disposal for application]

[Patent number]

[Date of registration]

[Number of appeal against examiner's decision of rejection]

[Date of requesting appeal against
examiner's decision of rejection]
[Date of extinction of right]

CLAIMS

[Claim(s)]
[Claim 1] In a reader writer with the controlling element which determines a reference clock value, a transmitted carrier frequency, a received carrier frequency, and a communication link baud rate clock value A dividing means to carry out dividing of the clock inputted from the outside, and to generate a reference clock, A transmitting carrier generation means to generate a transmitting carrier by the reference clock generated with this dividing means, A receiving carrier generation means to generate a receiving carrier by the reference clock generated with the above-mentioned dividing means, A communication link baud rate generation means to generate a communication link baud rate clock by the reference clock generated with the above-mentioned dividing means, The reference clock value determined by the above-mentioned controlling element, a transmitted carrier frequency, a received carrier frequency, Receive the information on a communication link baud rate clock value, and the reference clock value generated with the above-mentioned dividing means based on this received information is set as the above-mentioned dividing means. The transmitted carrier frequency generated with the above-mentioned transmitting carrier generation means is set as the above-mentioned transmitting carrier generation means. The reader writer carry out having provided a setting means to have set the received carrier frequency generated with the above-mentioned receiving carrier generation means as the above-mentioned receiving carrier generation means, and to set the communication link baud rate clock value generated with the above-mentioned communication link baud rate generation means as the above-mentioned communication link baud rate generation means as the description.
[Claim 2] In a reader writer with the controlling element which determines a reference clock value, a transmitted carrier frequency, a received carrier frequency, and a communication link baud rate clock value A dividing means to carry out dividing of the clock inputted from the outside, and to generate a reference clock, A transmitting carrier generation means to carry out dividing of the reference clock generated with this dividing means, and to generate a transmitting carrier, A receiving carrier generation means to carry out dividing of the reference clock generated with the above-mentioned dividing means, and to generate a receiving carrier, A communication link baud rate generation means to carry out dividing of the reference clock generated with the above-mentioned dividing means, and to generate a communication link baud rate clock, The reference clock value determined by the above-mentioned controlling element, a transmitted carrier frequency, a received carrier frequency, The dividing value which receives the serial data of a communication link baud rate clock value, decodes this received serial data, and generates the above-mentioned reference clock value is set as the above-mentioned dividing means. The dividing value which generates the above-mentioned transmitted carrier frequency is set as the above-mentioned transmitting carrier generation means. The reader writer characterized by providing a setting means to set the dividing value which generates the above-mentioned received carrier frequency as the above-mentioned receiving carrier generation means, and to set the dividing value which generates the above-mentioned communication link baud rate clock value as the above-mentioned communication link baud rate generation means.
[Claim 3] In a reader writer with the controlling element which specifies the identification information given to two or more communication link condition information, and determines communication link conditions A dividing means to carry out dividing of the clock inputted from the outside, and to generate a reference clock, A transmitting carrier generation means to generate a transmitting carrier by the reference clock generated with this dividing means, A receiving carrier generation means to generate a receiving carrier by the reference clock generated with the above-mentioned dividing means, A communication link baud rate generation means to generate a communication link baud rate clock by the reference clock generated with the above-mentioned dividing means, A reference clock value, a transmitted carrier frequency, a received carrier frequency, and a storage means by which two or

more communication link condition information that identification information was given to communication link condition information including a communication link baud rate clock value is memorized beforehand, Receive the identification information which specifies the communication link conditions determined by the above-mentioned controlling element, and the above-mentioned storage means is searched using this identification information that received. The reference clock value generated with the above-mentioned dividing means as communication link condition information retrieved and called is set as the above-mentioned dividing means. The transmitted carrier frequency generated with the above-mentioned transmitting carrier generation means is set as the above-mentioned transmitting carrier generation means. The reader writer carry out having provided a setting means to have set the received carrier frequency generated with the above-mentioned receiving carrier generation means as the above-mentioned receiving carrier generation means, and to set the communication link baud rate clock value generated with the above-mentioned communication link baud rate generation means as the above-mentioned communication link baud rate generation means as the description.

[Claim 4] In a reader writer with the controlling element which determines the identification information given to two or more communication link condition information A dividing means to carry out dividing of the clock inputted from the outside, and to generate a reference clock, A transmitting carrier generation means to carry out dividing of the reference clock generated with this dividing means, and to generate a transmitting carrier, A receiving carrier generation means to carry out dividing of the reference clock generated with the above-mentioned dividing means, and to generate a receiving carrier, A communication link baud rate generation means to carry out dividing of the reference clock generated with the above-mentioned dividing means, and to generate a communication link baud rate clock, A reference clock value, a transmitted carrier frequency, a received carrier frequency, and a storage means by which two or more communication link conditions that identification information was given to communication link condition information including the dividing value which generates a communication link baud rate clock value are memorized beforehand, Receive the identification information which specifies the communication link conditions determined by the above-mentioned controlling element, and the above-mentioned storage means is searched using this identification information that received. The dividing value which generates the reference clock value as communication link condition information retrieved and called is set as the above-mentioned dividing means. The dividing value which generates a transmitted carrier frequency is set as the above-mentioned transmitting carrier generation means. The reader writer characterized by providing a setting means to set the dividing value which generates a received carrier frequency as the above-mentioned receiving carrier generation means, and to set the dividing value which generates a communication link baud rate clock value as the above-mentioned communication link baud rate generation means.

[Claim 5] In the reader writer which has the controlling element which determines a reference clock value, a transmitted carrier frequency, a received carrier frequency, and a communication link baud rate clock value, and performs a wireless card and radio A dividing means to carry out dividing of the clock inputted from the outside, and to generate a reference clock, A transmitting carrier generation means to generate a transmitting carrier by the reference clock generated with this dividing means, A receiving carrier generation means to generate a receiving carrier by the reference clock generated with the above-mentioned dividing means, A communication link baud rate generation means to generate a communication link baud rate clock by the reference clock generated with the above-mentioned dividing means, The reference clock value determined by the above-mentioned controlling element, a transmitted carrier frequency, a received carrier frequency, Receive the information on a communication link baud rate clock value, and the reference clock value generated with the above-mentioned dividing means based on this received information is set as the above-mentioned dividing means. The transmitted carrier frequency generated with the above-mentioned transmitting carrier generation means is set as the above-mentioned transmitting carrier generation means. A setting means to set the received carrier frequency generated with the above-mentioned receiving carrier generation means as the above-mentioned receiving carrier generation means, and to set the communication link baud rate clock value generated with the above-mentioned communication link baud rate generation means as the above-mentioned communication link baud rate generation means, The transmitting carrier generated with the above-mentioned transmitting carrier generation means set up with this setting means, The communication link baud rate clock generated with the above-mentioned communication link baud rate generation means, and a transmission-control means to generate modulation data from the transmit data transmitted from the above-mentioned controlling element, The receiving carrier generated with the above-mentioned receiving carrier generation means set up with the above-mentioned setting means, A reception-control means to generate recovery data from the received data received from the communication link baud rate clock

generated with the above-mentioned communication link baud rate generation means, and the above-mentioned wireless card, The reader writer characterized by providing the control means which controls data processing to the above-mentioned transmit data to the above-mentioned transmission-control means, and controls data processing to the above-mentioned recovery data to the above-mentioned reception-control means.

[Claim 6] Data processing controlled by the above-mentioned control means is addition and deletion of synchronous character data, addition and deletion of CRC operation data, addition and deletion of a frame start / frame termination character, and a reader writer according to claim 5 characterized by being such combination.

[Claim 7] It is the communication link conditioning approach of a reader writer with the controlling element which determines a reference clock value, a transmitted carrier frequency, a received carrier frequency, and a communication link baud rate clock value. The step which carries out dividing of the clock inputted from the outside, and generates a reference clock, The step which generates a transmitting carrier by this reference clock, and the step which generates a receiving carrier by the above-mentioned reference clock, The step which generates a communication link baud rate clock by the above-mentioned reference clock, The reference clock value determined by the above-mentioned controlling element, a transmitted carrier frequency, a received carrier frequency, Receive the information on a communication link baud rate clock value, and the above-mentioned reference clock value which carries out generation is set up based on this received information. the step which sets up the above-mentioned transmitted carrier frequency which carries out generation, sets up the above-mentioned received carrier frequency which carries out generation, and sets up the above-mentioned communication link baud rate clock value which carries out generation -- since -- the communication link conditioning approach of the reader writer characterized by becoming.

[Claim 8] It is the communication link conditioning approach of a reader writer with the controlling element which determines a reference clock value, a transmitted carrier frequency, a received carrier frequency, and a communication link baud rate clock value. The step which carries out dividing of the clock inputted from the outside, and generates a reference clock, The step which carries out dividing of this reference clock, and generates a transmitting carrier, and the step which carries out dividing of the above-mentioned reference clock, and generates a receiving carrier, The step which carries out dividing of the above-mentioned reference clock, and generates a communication link baud rate clock, The reference clock value determined by the above-mentioned controlling element, a transmitted carrier frequency, a received carrier frequency, The dividing value which receives the serial data of a communication link baud rate clock value, decodes this received Syria ** data, and generates the above-mentioned reference clock value is set up. the step which sets up the dividing value which generates the above-mentioned transmitted carrier frequency, sets up the dividing value which generates the above-mentioned received carrier frequency, and sets up the dividing value which generates the above-mentioned communication link baud rate clock value -- since -- the communication link conditioning approach of the reader writer characterized by becoming.

[Claim 9] The step which carries out dividing of the clock which is the communication link conditioning approach of a reader writer with the controlling element which specifies the identification information given to two or more communication link condition information, and determines communication link conditions, and is inputted from the outside, and generates a reference clock, The step which generates a transmitting carrier by this reference clock, and the step which generates a receiving carrier by the above-mentioned reference clock, The step which generates a communication link baud rate clock by the above-mentioned reference clock, The step which memorizes beforehand two or more communication link condition information that identification information was given to communication link condition information including a reference clock value, a transmitted carrier frequency, a received carrier frequency, and a communication link baud rate clock value, Receive the identification information which specifies the communication link conditions determined by the above-mentioned controlling element, search the identification information which is carrying out [above-mentioned] storage using this identification information that received, and communication link condition information is called. The step set up the above-mentioned reference clock value which is included in this communication link condition information, and which carries out generation, set up the above-mentioned transmitted carrier frequency which carries out generation, set up the above-mentioned received carrier frequency which carries out generation, and set up the above-mentioned communication link baud rate clock value which carries out generation, since -- the communication link conditioning approach of the reader writer characterized by becoming.

[Claim 10] The step which carries out dividing of the clock which is the communication link conditioning approach of a reader writer with the controlling element which determines the identification information given to two or more

communication link condition information, and is inputted from the outside, and generates a reference clock, The step which carries out dividing of this reference clock, and generates a transmitting carrier, and the step which carries out dividing of the above-mentioned reference clock, and generates a receiving carrier, The step which carries out dividing of the above-mentioned reference clock, and generates a communication link baud rate clock, The step which memorizes beforehand two or more communication link conditions that identification information was given to communication link condition information including the dividing value which generates a reference clock value, a transmitted carrier frequency, a received carrier frequency, and a communication link baud rate clock value, Receive the identification information which specifies the communication link conditions determined by the above-mentioned controlling element, search the identification information which is carrying out [above-mentioned] storage using this identification information that received, and communication link condition information is called. The dividing value which generates the reference clock value included in principle ****** is set up. this connoisseur -- the step which sets up the dividing value which generates a transmitted carrier frequency, sets up the dividing value which generates a received carrier frequency, and sets up the dividing value which generates a communication link baud rate clock value -- since -- the communication link conditioning approach of the reader writer characterized by becoming.

[Claim 11] It has the controlling element which determines a reference clock value, a transmitted carrier frequency, a received carrier frequency, and a communication link baud rate clock value. The step which carries out dividing of the clock which is the communication link conditioning approach of the reader writer which performs a wireless card and radio, and is inputted from the outside, and generates a reference clock, The step which generates a transmitting carrier by this reference clock, and the step which generates a receiving carrier by the above-mentioned reference clock, The step which generates a communication link baud rate clock by the above-mentioned reference clock, The reference clock value determined by the above-mentioned controlling element, a transmitted carrier frequency, a received carrier frequency, Receive the information on a communication link baud rate clock value, and the above-mentioned reference clock value which carries out generation is set up based on this received information. The step which sets up the above-mentioned transmitted carrier frequency which carries out generation, sets up the above-mentioned received carrier frequency which carries out generation, and sets up the above-mentioned communication link baud rate clock value which carries out generation, The transmitting carrier generated by the transmitted carrier frequency by which a setup was carried out [above-mentioned], the communication link baud rate clock generated with the communication link baud rate clock value by which a setup was carried out [above-mentioned], The step which generates modulation data from the transmit data transmitted from the above-mentioned controlling element, The step which generates recovery data from the received data received from the receiving carrier generated by the received carrier frequency by which a setup was carried out [above-mentioned], the communication link baud rate clock generated with the above-mentioned communication link baud rate clock value, and the above-mentioned wireless card, the step which controls data processing to the above-mentioned transmit data, and controls data processing to the above-mentioned recovery data -- since -- the communication link conditioning approach of the reader writer characterized by becoming.

[Translation done.]

DETAILED DESCRIPTION

[Detailed Description of the Invention]

[0001]

[Field of the Invention] This invention exchanges data between high order equipment and a wireless card, and relates to the communication link conditioning approach of a reader writer and a reader writer which consists of an interface with these, and MPU which controls the whole.

[0002]

[Description of the Prior Art] Conventionally, the wireless card processing system for wireless cards consists of a host (high order equipment, PC), a reader writer (R/W),

and a wireless card. The above-mentioned reader writer connects a host (PC) and a wireless card. This reader writer is constituted by the interface and transceiver circuit which consist of MPU and LSI which control the whole.

[0003] The wireless (IC) card is operating on various communication link conditions by the class each. The reader writer for performing the communication link with these wireless card until now was manufacturing respectively the thing with the communicate mode corresponding to the communication link conditions of a wireless card. Therefore, it is necessary to prepare the reader writer B' for a wireless card with the communication link conditions [writer / A' / reader] B at a wireless card with the communication link conditions A.

[0004] The communication link conditions said here are a "received carrier frequency", a "transmitted carrier frequency", and a "transceiver communication link baud rate."

[0005] However, making a reader writer according to the communication link conditions of each wireless card has very bad development effectiveness. Moreover, although making a reader writer with other completely equivalent functions only from only communication link conditions differing by the class of a wireless card did not have a problem technically, the effort serious in development effectiveness and a maintenance side occurred, and there was a problem that effectiveness worsened.

[0006]

[Problem(s) to be Solved by the Invention] Although making a reader writer according to the communication link conditions of each wireless card had very bad development effectiveness and it did not have a problem technically that only communication link conditions only differ and other functions completely make an equivalent reader writer by the class of a wireless card as described above, the effort serious in development effectiveness and a maintenance side occurred, and there was a problem that effectiveness worsened.

[0007] Then, this invention gives the versatility corresponding to various communication link conditions, and aims at offering the communication link conditioning approach of a reader writer and a reader writer which can raise development effectiveness and the effectiveness of a maintenance.

[0008]

[Means for Solving the Problem] In a reader writer with the controlling element as which the reader writer of this invention determines a reference clock value, a transmitted carrier frequency, a received carrier frequency, and a communication link baud rate clock value A dividing means to carry out dividing of the clock inputted from the outside, and to generate a reference clock, A transmitting carrier generation means to generate a transmitting carrier by the reference clock generated with this dividing means, A receiving carrier generation means to generate a receiving carrier by the reference clock generated with the above-mentioned dividing means, A communication link baud rate generation means to generate a communication link baud rate clock by the reference clock generated with the above-mentioned dividing means, The reference clock value determined by the above-mentioned controlling element, a transmitted carrier frequency, a received carrier frequency, Receive the information on a communication link baud rate clock value, and the reference clock value generated with the above-mentioned dividing means based on this received information is set as the above-mentioned dividing means. The transmitted carrier frequency generated with the above-mentioned transmitting carrier generation means is set as the above-mentioned transmitting carrier generation means. It consists of setting means to set the received carrier frequency generated with the above-mentioned receiving carrier generation means as the above-mentioned receiving carrier generation means, and to set the communication link baud rate clock value generated with the above-mentioned communication link baud rate generation means as the above-mentioned communication link baud rate generation means.

[0009] In a reader writer with the controlling element as which the reader writer of this invention determines a reference clock value, a transmitted carrier frequency, a received carrier frequency, and a communication link baud rate clock value A dividing means to carry out dividing of the clock inputted from the outside, and to generate a reference clock, A transmitting carrier generation means to carry out dividing of the reference clock generated with this dividing means, and to generate a transmitting carrier, A receiving carrier generation means to carry out dividing of the reference clock generated with the above-mentioned dividing means, and to generate a receiving carrier, A communication link baud rate generation means to carry out dividing of the reference clock generated with the above-mentioned dividing means, and to generate a communication link baud rate clock, The reference clock value determined by the above-mentioned controlling element, a transmitted carrier frequency, a received carrier frequency, The dividing value which receives the serial data of a communication link baud rate clock value, decodes this received serial data, and generates the above-mentioned reference clock value is set as the above-mentioned dividing means. The dividing value which generates the above-mentioned transmitted carrier frequency is set as the above-mentioned transmitting carrier generation means. It consists of setting means to set the dividing

value which generates the above-mentioned received carrier frequency as the above-mentioned receiving carrier generation means, and to set the dividing value which generates the above-mentioned communication link baud rate clock value as the above-mentioned communication link baud rate generation means.

[0010] In a reader writer with the controlling element which the reader writer of this invention specifies the identification information given to two or more communication link condition information, and determines communication link conditions A dividing means to carry out dividing of the clock inputted from the outside, and to generate a reference clock, A transmitting carrier generation means to generate a transmitting carrier by the reference clock generated with this dividing means, A receiving carrier generation means to generate a receiving carrier by the reference clock generated with the above-mentioned dividing means, A communication link baud rate generation means to generate a communication link baud rate clock by the reference clock generated with the above-mentioned dividing means, A reference clock value, a transmitted carrier frequency, a received carrier frequency, and a storage means by which two or more communication link condition information that identification information was given to communication link condition information including a communication link baud rate clock value is memorized beforehand, Receive the identification information which specifies the communication link conditions determined by the above-mentioned controlling element, and the above-mentioned storage means is searched using this identification information that received. The reference clock value generated with the above-mentioned dividing means as communication link condition information retrieved and called is set as the above-mentioned dividing means. The transmitted carrier frequency generated with the above-mentioned transmitting carrier generation means is set as the above-mentioned transmitting carrier generation means. It consists of setting means to set the received carrier frequency generated with the above-mentioned receiving carrier generation means as the above-mentioned receiving carrier generation means, and to set the communication link baud rate clock value generated with the above-mentioned communication link baud rate generation means as the above-mentioned communication link baud rate generation means.

[0011] In a reader writer with the controlling element which determines the identification information by which the reader writer of this invention was given to two or more communication link condition information A dividing means to carry out dividing of the clock inputted from the outside, and to generate a reference clock, A transmitting carrier generation means to carry out dividing of the reference clock generated with this dividing means, and to generate a transmitting carrier, A receiving carrier generation means to carry out dividing of the reference clock generated with the above-mentioned dividing means, and to generate a receiving carrier, A communication link baud rate generation means to carry out dividing of the reference clock generated with the above-mentioned dividing means, and to generate a communication link baud rate clock, A reference clock value, a transmitted carrier frequency, a received carrier frequency, and a storage means by which two or more communication link conditions that identification information was given to communication link condition information including the dividing value which generates a communication link baud rate clock value are memorized beforehand, Receive the identification information which specifies the communication link conditions determined by the above-mentioned controlling element, and the above-mentioned storage means is searched using this identification information that received. The dividing value which generates the reference clock value as communication link condition information retrieved and called is set as the above-mentioned dividing means. The dividing value which generates a transmitted carrier frequency is set as the above-mentioned transmitting carrier generation means. It consists of setting means to set the dividing value which generates a received carrier frequency as the above-mentioned receiving carrier generation means, and to set the dividing value which generates a communication link baud rate clock value as the above-mentioned communication link baud rate generation means.

[0012] In the reader writer which the reader writer of this invention has the controlling element which determines a reference clock value, a transmitted carrier frequency, a received carrier frequency, and a communication link baud rate clock value, and performs a wireless card and radio A dividing means to carry out dividing of the clock inputted from the outside, and to generate a reference clock, A transmitting carrier generation means to generate a transmitting carrier by the reference clock generated with this dividing means, A receiving carrier generation means to generate a receiving carrier by the reference clock generated with the above-mentioned dividing means, A communication link baud rate generation means to generate a communication link baud rate clock by the reference clock generated with the above-mentioned dividing means, The reference clock value determined by the above-mentioned controlling element, a transmitted carrier frequency, a received carrier frequency, Receive the information on a communication link baud rate clock value, and the reference clock value generated with the above-mentioned dividing means based on this received information is set as the above-mentioned dividing means. The transmitted carrier

frequency generated with the above-mentioned transmitting carrier generation means is set as the above-mentioned transmitting carrier generation means. A setting means to set the received carrier frequency generated with the above-mentioned receiving carrier generation means as the above-mentioned receiving carrier generation means, and to set the communication link baud rate clock value generated with the above-mentioned communication link baud rate generation means as the above-mentioned communication link baud rate generation means, The transmitting carrier generated with the above-mentioned transmitting carrier generation means set up with this setting means, The communication link baud rate clock generated with the above-mentioned communication link baud rate generation means, and a transmission-control means to generate modulation data from the transmit data transmitted from the above-mentioned controlling element, The receiving carrier generated with the above-mentioned receiving carrier generation means set up with the above-mentioned setting means, A reception-control means to generate recovery data from the received data received from the communication link baud rate clock generated with the above-mentioned communication link baud rate generation means, and the above-mentioned wireless card, It consists of control means which control data processing to the above-mentioned transmit data to the above-mentioned transmission-control means, and control data processing to the above-mentioned recovery data to the above-mentioned reception-control means.

[0013] The communication link conditioning approach of the reader writer this invention It is the communication link conditioning approach of a reader writer with the controlling element which determines a reference clock value, a transmitted carrier frequency, a received carrier frequency, and a communication link baud rate clock value. The step which carries out dividing of the clock inputted from the outside, and generates a reference clock, The step which generates a transmitting carrier by this reference clock, and the step which generates a receiving carrier by the above-mentioned reference clock, The step which generates a communication link baud rate clock by the above-mentioned reference clock, The reference clock value determined by the above-mentioned controlling element, a transmitted carrier frequency, a received carrier frequency, Receive the information on a communication link baud rate clock value, and the above-mentioned reference clock value which carries out generation is set up based on this received information. It is characterized by consisting of a step which sets up the above-mentioned transmitted carrier frequency which carries out generation, sets up the above-mentioned received carrier frequency which carries out generation, and sets up the above-mentioned communication link baud rate clock value which carries out generation.

[0014] The communication link conditioning approach of the reader writer this invention It is the communication link conditioning approach of a reader writer with the controlling element which determines a reference clock value, a transmitted carrier frequency, a received carrier frequency, and a communication link baud rate clock value. The step which carries out dividing of the clock inputted from the outside, and generates a reference clock, The step which carries out dividing of this reference clock, and generates a transmitting carrier, and the step which carries out dividing of the above-mentioned reference clock, and generates a receiving carrier, The step which carries out dividing of the above-mentioned reference clock, and generates a communication link baud rate clock, The reference clock value determined by the above-mentioned controlling element, a transmitted carrier frequency, a received carrier frequency, The dividing value which receives the serial data of a communication link baud rate clock value, decodes this received Syria ** data, and generates the above-mentioned reference clock value is set up. It is characterized by consisting of a step which sets up the dividing value which generates the above-mentioned transmitted carrier frequency, sets up the dividing value which generates the above-mentioned received carrier frequency, and sets up the dividing value which generates the above-mentioned communication link baud rate clock value.

[0015] The communication link conditioning approach of the reader writer this invention The step which carries out dividing of the clock which is the communication link conditioning approach of a reader writer with the controlling element which specifies the identification information given to two or more communication link condition information, and determines communication link conditions, and is inputted from the outside, and generates a reference clock, The step which generates a transmitting carrier by this reference clock, and the step which generates a receiving carrier by the above-mentioned reference clock, The step which generates a communication link baud rate clock by the above-mentioned reference clock, The step which memorizes beforehand two or more communication link condition information that identification information was given to communication link condition information including a reference clock value, a transmitted carrier frequency, a received carrier frequency, and a communication link baud rate clock value, Receive the identification information which specifies the communication link conditions determined by the above-mentioned controlling element, search the identification information which is carrying out [above-mentioned] storage using this identification information that received, and communication link condition information is called. It

carries out setting up the above-mentioned reference clock value which is included in this communication link condition information and which carries out generation, setting up the above-mentioned transmitted carrier frequency which carries out generation, setting up the above-mentioned received carrier frequency which carries out generation, and becoming from the step set up about the above-mentioned communication link baud rate clock value which carries out generation as the description.

[0016] The communication link conditioning approach of the reader writer this invention The step which carries out dividing of the clock which is the communication link conditioning approach of a reader writer with the controlling element which determines the identification information given to two or more communication link condition information, and is inputted from the outside, and generates a reference clock, The step which carries out dividing of this reference clock, and generates a transmitting carrier, and the step which carries out dividing of the above-mentioned reference clock, and generates a receiving carrier, The step which carries out dividing of the above-mentioned reference clock, and generates a communication link baud rate clock, The step which memorizes beforehand two or more communication link conditions that identification information was given to communication link condition information including the dividing value which generates a reference clock value, a transmitted carrier frequency, a received carrier frequency, and a communication link baud rate clock value, Receive the identification information which specifies the communication link conditions determined by the above-mentioned controlling element, search the identification information which is carrying out [above-mentioned] storage using this identification information that received, and communication link condition information is called. this connoisseur -- it is characterized by consisting of a step which sets up the dividing value which generates the reference clock value included in principle ******, sets up the dividing value which generates a transmitted carrier frequency, sets up the dividing value which generates a received carrier frequency, and sets up the dividing value which generates a communication link baud rate clock value.

[0017] The communication link conditioning approach of the reader writer this invention It has the controlling element which determines a reference clock value, a transmitted carrier frequency, a received carrier frequency, and a communication link baud rate clock value. The step which carries out dividing of the clock which is the communication link conditioning approach of the reader writer which performs a wireless card and radio, and is inputted from the outside, and generates a reference clock, The step which generates a transmitting carrier by this reference clock, and the step which generates a receiving carrier by the above-mentioned reference clock, The step which generates a communication link baud rate clock by the above-mentioned reference clock, The reference clock value determined by the above-mentioned controlling element, a transmitted carrier frequency, a received carrier frequency, Receive the information on a communication link baud rate clock value, and the above-mentioned reference clock value which carries out generation is set up based on this received information. The step which sets up the above-mentioned transmitted carrier frequency which carries out generation, sets up the above-mentioned received carrier frequency which carries out generation, and sets up the above-mentioned communication link baud rate clock value which carries out generation, The transmitting carrier generated by the transmitted carrier frequency by which a setup was carried out [above-mentioned], the communication link baud rate clock generated with the communication link baud rate clock value by which a setup was carried out [above-mentioned], The step which generates modulation data from the transmit data transmitted from the above-mentioned controlling element, The step which generates recovery data from the received data received from the receiving carrier generated by the received carrier frequency by which a setup was carried out [above-mentioned], the communication link baud rate clock generated with the above-mentioned communication link baud rate clock value, and the above-mentioned wireless card, It is characterized by consisting of a step which controls data processing to the above-mentioned transmit data, and controls data processing to the above-mentioned recovery data.

[0018]

[Embodiment of the Invention] Hereafter, the gestalt of 1 implementation of this invention is explained with reference to a drawing.

[0019] Drawing 1 shows the outline configuration of the wireless card processing system concerning this invention.

[0020] That is, the wireless card processing system is constituted by the wireless (IC) card 4 which performs radio, and -- between the personal computer (PC) 1 as high order equipment, and the antenna section 3 of the reader writer (R/W) 2 connected to this PC1, and this reader writer 2.

[0021] PC1 is constituted by the control section which is not illustrated, the control unit, the display, and the connection of the reader writer 2.

[0022] The reader writer 2 is constituted by MPU5 as a control circuit (controlling element) which controls the whole reader writer 2, LSI6 for the wireless card reader

writers as an interface, the transceiver circuit 7, the antenna section 3, and the input-clock frequency divider 21.

[0023] MPU5 memorizes CPU11 which controls whole MPU5, a control program, and various ****, and is constituted by S1013 the input of the serial data for the communication link with the memory 12 and LSI6 which consist of RAM and a ROM, and for output.

[0024] It connects with the above PC 1, an exchange of data is performed, and CPU11 transmits a data lead command to LSI6 to reception of a data lead command.

[0025] The I/O Port the I/O Port of ** and for the serial input (data SI) serial output data (SO), the I/O Port for serial clocks (SCK), and the I/O Port for control signals (CONT) are formed in the above S1013.

[0026] the above S1013 -- the data lead command of the wireless card 4 -- the I/O Port for SI -- mustard -- it outputs to SI6.

[0027] The antenna section 3 is constituted by the transmitting antenna 14 and the receiving antenna 15.

[0028] The above-mentioned transceiver circuit 7 is constituted by the sending circuit 16 and the receiving circuit 17.

[0029] The wireless card 4 is constituted by the memory which memorizes various information, such as a control circuit which controls the whole, a control program, a random number, and ID (recognition number) data, the modulation demodulator circuit, the power-source generating circuit, and the transceiver antenna.

[0030] Drawing 2 shows the outline configuration of LSI6. LSI6 consists of the input-clock frequency divider 21, MPUI/F22, the transmitting carrier generation circuit 23, the receiving carrier generation circuit 24, a communication link baud rate generation circuit 25, a transmission-control circuit (modulation circuit) 26, and a reception-control circuit (demodulator circuit) 27.

[0031] The input-clock frequency divider 21 carries out dividing of the external clock inputted into the reader writer 2, and generates the clock used as the criteria of a system. For example, the function of the general-purpose reader writer by this invention can be made into that more flexible by establishing the dividing value of 1/1 / 1.5, 1/2, and a 1 / 4 grades. [1 and 1]

[0032] The MPUI/F circuit 22 is an interface (I/F) circuit for software to perform automatically a setup of each register of the above-mentioned input-clock frequency divider 21, the transmitting carrier generation circuit 23, the receiving carrier generation circuit 24, and the communication link baud rate generation circuit 25 through the serial terminal of MPU5. By receiving and decoding the serial data from MPU5, each register of the above-mentioned input-clock frequency divider 21, the transmitting carrier generation circuit 23, the receiving carrier generation circuit 24, and the communication link baud rate generation circuit 25 is set up.

[0033] The transmitting carrier generation circuit 23 is for setting up the transmitted carrier frequency to the wireless card 4 from the reference clock generated in the input-clock frequency divider 21. It realizes by carrying out dividing of the reference clock to any value.

[0034] The receiving carrier generation circuit 24 is for setting up the received carrier frequency of the received data from the wireless card 4 from the reference clock generated in the input-clock frequency divider 21. It realizes by carrying out dividing of the reference clock to any value.

[0035] The communication link baud rate generation circuit 25 is for setting up a communication link baud rate clock (one 16 times the frequency of a baud rate) with the wireless card 4 from the reference clock generated in the input-clock frequency divider 21. It realizes by carrying out dividing of the reference clock to any value.

[0036] The transmission-control circuit 26 is a circuit which generates the modulation data to the wireless card 4 with the transmitting carrier generated in the transmitting carrier generation circuit 23, the communication link baud rate clock generated in the communication link baud rate generation circuit 25, and the transmit data from the MPUI/F circuit 22.

[0037] The reception-control circuit 27 is a circuit which generates the recovery data to MPU5 with the received data from the wireless card 4, the receiving carrier generated in the receiving carrier generation circuit 24, and the communication link baud rate clock generated in the communication link baud rate generation circuit 25.

[0038] Next, in such a configuration, actuation of the reader writer 2 is explained with reference to the flow chart of drawing 3 .

[0039] When a power source is switched on (ST1), the MPUI/F circuit 22 judges the initial communicate mode as a communications protocol with MPU5 (ST2).

[0040] According to this judgment, the MPUI/F circuit 22 receives communication link condition information through serial communication from MPU5. Decode the received communication link condition information and the dividing value of the input-clock frequency divider 21 is set up based on this decoded communication link condition (ST3). The transmitted carrier frequency of the transmitting carrier generation circuit 23 is set up (ST4), the received carrier frequency of the receiving carrier generation circuit 24 is set up (ST5), and the communication link baud rate of the communication link baud rate generation circuit 25 is set up (ST6).

[0041] And from MPU5, the MPUI/F circuit 22 receives the information on the other modes through serial communication, sets up the other modes (ST7), confirms all setup (ST8), and starts the communication link with the wireless card 4 (ST22).
[0042] Communication link conditions with the wireless card 4 are set up by the routine of the step 3-STs 6 mentioned above. However, this order of a setup does not ask. These setup is automatically performed after powering on by the software memorized by the memory 12 of MPU5 using serial I/F of MPU5.
[0043] Next, the 1st example in the reader writer 2 constituted concretely is explained with reference to drawing 4 . A setup of the reader writer 2 for enabling the communication link with the wireless card 4 which operates on the following communication link conditions is as follows.
[0044] communication link condition input-clock frequency: -- 16MHz transmitted carrier frequency: -- 125kHz received carrier frequency: -- 62.5kHz communication link baud rate: -- 7800 bpsMPUI/F circuits 22 follow the flow shown by drawing 3 , and set up the reader writer 2. First, in setting up each register in a step 3-STs 6, MPU5 decides what kind of value to set up beforehand.
[0045] Then, it receives through serial communication from MPU5, and the MPUI/F circuit 22 sets up the value determined here to each register of the input-clock frequency divider 21, the transmitting carrier generation circuit 23, the receiving carrier generation circuit 24, and the communication link baud rate generation circuit 25.
[0046] A setup of each register to communication link conditions here is as follows.
[0047] a. Set the input-clock dividing value of the input-clock frequency divider 21 as one half, and generate the reference clock (8MHz) used as the base of actuation of the reader writer 2 from an input clock (16MHz).
[0048] b. In order to generate the transmitted carrier frequency (125kHz) to the reference clock generated in the input-clock frequency divider 21, set the dividing value of the transmitting carrier generation circuit 23 as 1/64.
[0049] c. In order to generate the received carrier frequency (62.5kHz) to the reference clock generated in the input-clock frequency divider 21, set the dividing value of the receiving carrier generation circuit 24 as 1/128.
[0050] d. In order to set up the communication link baud rate (7800bps) to the reference clock generated in the input-clock frequency divider 21, set the dividing value of the communication link baud rate generation circuit 25 as 1/64. The clock generated here is 16 times the frequency of a baud rate.
[0051] Thus, by setting up, the communication link with the wireless card 4 equipped with the above-mentioned communication link conditions is attained. However, the order of a setup of a, b, c, and d does not ask. Moreover, the set point (dividing value) of each register shown here is an example, and must not necessarily be set up in this way to the above-mentioned communication link conditions. A system construction person can specify the set point of each register as arbitration.
[0052] Next, the 2nd example in the reader writer 2 constituted concretely is explained with reference to drawing 5 . An input clock is changed into 8MHz to the communication link conditions shown by drawing 4 , and other conditions are the same as drawing 4 .
[0053] The MPUI/F circuit 22 follows the flow shown by drawing 3 , and sets up the reader writer 2.
[0054] a. Set the input-clock dividing value of the input-clock frequency divider 21 as 1/1, and generate the reference clock (8MHz) used as the base of actuation of the reader writer 2 from an input clock (8MHz). In addition, about the dividing value of the b. transmitting carrier generation circuit 23, the dividing value of the c. receiving carrier generation circuit 24, and the dividing value of d. communication link baud rate generation circuit 25, it is the same as drawing 4 .
[0055] Thus, by setting up, the communication link with the wireless card 4 equipped with the above-mentioned communication link conditions is attained. However, the order of a setup of Above a, b, c, and d does not ask. Moreover, the set point (dividing value) of each register shown here is an example, and must not necessarily be set up in this way to the above-mentioned communication link conditions. A system construction person can specify the set point of each register as arbitration.
[0056] Next, the 3rd example in the reader writer 2 constituted concretely is explained with reference to drawing 6 . A setup of the reader writer 2 for enabling the communication link with the wireless card 4 which operates on the following communication link conditions is as follows.
[0057] communication link condition input-clock frequency: -- 13.56MHz transmitted carrier frequency: -- 3.322MHz received carrier frequency: -- 847.5kHz communication link baud rate: -- 106 kbpsMPUI/F circuits 22 follow the flow shown by drawing 3 , and set up the reader writer 2. First, in setting up each register in a step 3-STs 6, MPU5 decides what kind of value to set up beforehand.
[0058] Then, it receives through serial communication from MPU5, and the MPU1/F circuit 22 sets up the value determined here to each register of the input-clock frequency divider 21, the transmitting carrier generation circuit 23, the receiving carrier generation circuit 24, and the communication link baud rate generation circuit

25.

[0059] A setup of each register to communication link conditions here is as follows.

[0060] a. Set the input-clock dividing value of the input-clock frequency divider 21 as 1/1, and generate the reference clock (13.56MHz) used as the base of actuation of a reader writer from an input clock (13.56MHz).

[0061] b. In order to generate the transmitted carrier frequency (3.322MHz) to the reference clock generated in the input-clock frequency divider 21, set the dividing value of the transmitting carrier generation circuit 23 as one fourth.

[0062] c. In order to generate the received carrier frequency (847.5kHz) to the reference clock generated in the input-clock frequency divider 21, set the dividing value of the receiving carrier generation circuit 24 as 1/16.

[0063] d. In order to set up the communication link baud rate to the reference clock generated in the input-clock frequency divider 21 (106kbps), set the dividing value of the communication link baud rate generation circuit 25 as one eighth. The clock generated here is 16 times the frequency of a baud rate.

[0064] Thus, by setting up, the communication link with the wireless card 4 equipped with the above-mentioned communication link conditions is attained. However, the order of a setup of a, b, c, and d does not ask. moreover, the set point (dividing value) of each register shown here is an example, and is not necessarily set up in this way to the above-mentioned communication link conditions -- it can kick, and if it is **, there is not necessarily nothing. A system construction person can specify the set point of each register as arbitration.

[0065] Next, the 4th example adapting the configuration in the reader writer 2 is explained with reference to drawing 7 . In this example, the communication link conditioning data storage memory 28 is prepared as an additional function.

[0066] In order to confirm the reader writer 2 to the wireless card 4 which is operating by the radical of some communication link conditions as shown above, it is necessary to set up each setting register of a step 3-STs 6 from MPU5. Although the register is accessed and set up according to an individual, respectively, now, processing occurs repeatedly and it becomes complicated.

[0067] So, in this example, the communication link conditioning data storage memory 10 which made these setting information memorize beforehand is prepared, and it specifies which [of memory information] MPU5 confirms. The MPUI/F circuit 22 sets up a communication link condition register automatically from the specified memory information.

[0068] Here, processing actuation of **** 4 example is explained with reference to the flow chart of drawing 8 .

[0069] When a power source is switched on (ST11), the MPUI/F circuit 22 judges the initial communicate mode as a communications protocol with MPU5 (ST12).

[0070] According to assignment of which [of the memory information from MPU5] the MPUI/F circuit 22 confirms, memory information is called from the communication link conditioning data storage memory 28 (ST13). Decode the contents of this memory information (ST14), and the dividing value of the input-clock frequency divider 21 is set up based on this decoded communication link conditioning data (ST15). The transmitted carrier frequency of the transmitting carrier generation circuit 23 is set up (ST16), the received carrier frequency of the receiving carrier generation circuit 24 is set up (ST17), and the communication link baud rate of the communication link baud rate generation circuit 25 is set up (ST18).

[0071] And from MPU5, the MPUI/F circuit 22 sets up the other modes through serial communication (ST19), confirms all setup (ST20), and starts the communication link with the wireless card 4 (ST21).

[0072] Drawing 9 is the example of a configuration of the memory information stored in the communication link conditioning data storage memory 28. For example, when a specification is in ISO10xxx mode, the address is set up with the 00th street and the function (register set point) is set up with input clocks 1/1, the transmitting carriers 1/1, the receiving carriers 1/16, and baud rates 1/32.

[0073] In the example of a configuration of this memory information, register setting information is arranged in the communication link conditioning data storage memory 28 for every functional specifications. When making it a setup corresponding to ISO10xxx mode, MPU5 can set up the reader writer 2 by [of the communication link conditioning data storage memory 28] confirming the 00th street.

[0074] Drawing 10 is other examples of a configuration of the memory information stored in the communication link conditioning data storage memory 28. For example, in the case of input-clock:16MHz, transmitting carrier:125kHz, receiving carrier:62.5kHz, and communication link baud rate:7800bps, the address is set up with the 00th street and the function (register set point) is set up for the specification with input clocks 1/2, the transmitting carriers 1/64, the receiving carriers 1/128, and baud rates 1/64.

[0075] In the example of a configuration of this memory information, register setting information is arranged in the communication link conditioning data storage memory 28 for every communication link conditions. For example, by setting the communication link conditions shown by drawing 4 as the 00th street of the communication link conditioning data storage memory 28, if the 00th street is

confirmed, a setup of the reader writer 2 will become the thing corresponding to this communication link condition which is the communication link conditioning data storage memory 10 from MPU5.

[0076] Next, the 5th example is explained with reference to drawing 11 .

[0077] The differences with drawing 2 in **** 5 example are the transmission-control circuit 31 and the reception-control circuit 32.

[0078] The transmission-control circuit (modulation circuit) 31 is a circuit which generates the modulation data to the wireless card 4 with the transmitting carrier generated in the transmitting carrier generation circuit 23, the communication link baud rate clock generated in the communication link baud rate generation circuit 25, and the transmit data from the MPUI/F circuit 22. Moreover, the existence of data processing is controllable by the data-processing control signal from the MPUI/F circuit 22 to transmit data.

[0079] Specifically, it is addition of 1 synchronous character data. At this time, the character value and character length of a synchronous character can specify it as arbitration from MPU5 separately.

[0080] 2) Addition of CRC operation data.

[0081] 3) Addition of a frame start character / frame termination character. Addition of a frame start/termination character can be specified according to an individual.

[0082] It has ******.

[0083] The reception-control circuit (demodulator circuit) 32 is a circuit which generates the recovery data to MPU5 with the received data from the wireless card 4, the receiving carrier generated in the receiving carrier generation circuit 24, and the communication link baud rate clock generated in the communication link baud rate generation circuit 25. Moreover, the existence of processing of data is controllable by the data-processing control signal from the MPUI/F circuit 22 to recovery data.

[0084] Specifically, it is deletion of 1 synchronous character data. At this time, the character value and character length of a synchronous character can specify it as arbitration from MPU5 separately.

[0085] 2) CRC operation acknowledgement function (error detection function).

[0086] 3) Deletion of a frame start character / frame termination character. Deletion of a frame start/termination character can be specified according to an individual.

[0087] It has ******.

[0088] Drawing 12 is the example of transmit data processing by the data-processing control signal in the transmission-control circuit 31. The radical data shown in (a) of drawing 12 are serial data transmitted from MPU5, and are these data which should be transmitted to the wireless card 4. Hereafter, six sorts of examples are shown and processing of the data to this radical data is explained. It is the example which is shown here to the last, and it is not what showed all realizable combination.

[0089] (b) shows the condition of the transmit data in the case of adding 1 byte of synchronous character. The synchronous character is added to the head of radical data. For example, the character of 92H is added.

[0090] (c) shows the condition of the transmit data in the case of adding 2 bytes of synchronous character. The synchronous character is added to the head of radical data. For example, the character of 9292H is added.

[0091] (d) shows the condition of the transmit data in the case of adding a CRC operation. The CRC operation was performed to radical data and the result of an operation is added after the last data transmission of these data. For example, when calculating CRC16, the result of an operation is added to 16 bits.

[0092] (e) shows the condition of the transmit data in the case of adding an initiation frame (SOF) / termination frame (EOF) before and after radical data, respectively. For example, the "High level" of a triplet can be added from the "Low level" of 10 to 11 bits, and 2 as SOF. Moreover, the "Low level" of 10 to 11 bits can be added as EOF.

[0093] (f) shows the condition of the transmit data in the case of adding an initiation frame (SOF) to the anterior part of radical data.

[0094] (g) shows the condition of the transmit data in the case of adding a termination frame (EOF) to the posterior part of radical data.

[0095] Processing of the recovery data based on the data-processing control signal in the reception-control circuit 32 performs the reverse of transmit data processing shown in (b) - (g) of drawing 12 . For example, the recovery data which deleted only the synchronous character from the recovery data with which the synchronous character was added to the head are generated, and it transmits as serial data to MPU5 (radical data are generated from the data of (b) of drawing 12).

[0096] As explained above, according to the gestalt of implementation of the above-mentioned invention, the general-purpose reader writer corresponding to a wireless card with various communication link conditions (an input-clock frequency, a received carrier frequency, a transmitted carrier frequency, transceiver communication link baud rate) is realizable.

[0097] Moreover, by using a reader writer widely, the need of manufacturing the reader writer system corresponding to each wireless card according to an individual is lost, and development effectiveness and the effectiveness of a maintenance improve.

[0098] Moreover, a functional setting register can be performed through serial I/F of

MPU, and since it has realized without adding an extraordinarily difficult function, it can master easily only by getting to know the fundamental operating instructions of MPU.

[0099] In addition, it becomes possible from MPU by storing information in memory also about each setting command about processing control of a transmitted and received data to set up automatically.

[0100]

[Effect of the Invention] As explained in full detail above, according to this invention, the versatility corresponding to various communication link conditions can be given, and the communication link conditioning approach of a reader writer and a reader writer which can raise development effectiveness and the effectiveness of a maintenance can be offered.

[Translation done.]

TECHNICAL FIELD

[Field of the Invention] This invention exchanges data between high order equipment and a wireless card, and relates to the communication link conditioning approach of a reader writer and a reader writer which consists of an interface with these, and MPU which controls the whole.

[Translation done.]

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PRIOR ART

[Description of the Prior Art] Conventionally, the wireless card processing system for wireless cards consists of a host (high order equipment, PC), a reader writer (R/W), and a wireless card. The above-mentioned reader writer connects a host (PC) and a wireless card. This reader writer is constituted by the interface and transceiver circuit which consist of MPU and LSI which control the whole.

[0003] The wireless (IC) card is operating on various communication link conditions by the class each. The reader writer for performing the communication link with these wireless card until now was manufacturing respectively the thing with the communicate mode corresponding to the communication link conditions of a wireless card. Therefore, it is necessary to prepare the reader writer B' for a wireless card with the communication link conditions [writer / A' / reader] B at a wireless card with the communication link conditions A.

[0004] The communication link conditions said here are a "received carrier frequency", a "transmitted carrier frequency", and a "transceiver communication link baud rate."

[0005] However, making a reader writer according to the communication link conditions of each wireless card has very bad development effectiveness. Moreover, although making a reader writer with other completely equivalent functions only from only communication link conditions differing by the class of a wireless card did not have a problem technically, the effort serious in development effectiveness and a maintenance side occurred, and there was a problem that effectiveness worsened.

[Translation done.]

EFFECT OF THE INVENTION

[Effect of the Invention] As explained in full detail above, according to this invention, the versatility corresponding to various communication link conditions can be given, and the communication link conditioning approach of a reader writer and a reader writer which can raise development effectiveness and the effectiveness of a maintenance can be offered.

[Translation done.]

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TECHNICAL PROBLEM

[Problem(s) to be Solved by the Invention] Although making a reader writer according to the communication link conditions of each wireless card had very bad development effectiveness and it did not have a problem technically that only communication link conditions only differ and other functions completely make an equivalent reader writer by the class of a wireless card as described above, the effort serious in development effectiveness and a maintenance side occurred, and there was a problem that effectiveness worsened.

[0007] Then, this invention gives the versatility corresponding to various communication link conditions, and aims at offering the communication link conditioning approach of a reader writer and a reader writer which can raise development effectiveness and the effectiveness of a maintenance.

[Translation done.]

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MEANS

[Means for Solving the Problem] In a reader writer with the controlling element as which the reader writer of this invention determines a reference clock value, a transmitted carrier frequency, a received carrier frequency, and a communication link baud rate clock value A dividing means to carry out dividing of the clock inputted from the outside, and to generate a reference clock, A transmitting carrier generation means to generate a transmitting carrier by the reference clock generated with this dividing means, A receiving carrier generation means to generate a receiving carrier by the reference clock generated with the above-mentioned dividing means, A communication link baud rate generation means to generate a communication link baud rate clock by the reference clock generated with the above-mentioned dividing means, The reference clock value determined by the above-mentioned controlling element, a transmitted carrier frequency, a received carrier frequency, Receive the information on a communication link baud rate clock value, and the reference clock value generated with the above-mentioned dividing means based on this received

information is set as the above-mentioned dividing means. The transmitted carrier frequency generated with the above-mentioned transmitting carrier generation means is set as the above-mentioned transmitting carrier generation means. It consists of setting means to set the received carrier frequency generated with the above-mentioned receiving carrier generation means as the above-mentioned receiving carrier generation means, and to set the communication link baud rate clock value generated with the above-mentioned communication link baud rate generation means as the above-mentioned communication link baud rate generation means.

[0009] In a reader writer with the controlling element as which the reader writer of this invention determines a reference clock value, a transmitted carrier frequency, a received carrier frequency, and a communication link baud rate clock value A dividing means to carry out dividing of the clock inputted from the outside, and to generate a reference clock, A transmitting carrier generation means to carry out dividing of the reference clock generated with this dividing means, and to generate a transmitting carrier, A receiving carrier generation means to carry out dividing of the reference clock generated with the above-mentioned dividing means, and to generate a receiving carrier, A communication link baud rate generation means to carry out dividing of the reference clock generated with the above-mentioned dividing means, and to generate a communication link baud rate clock, The reference clock value determined by the above-mentioned controlling element, a transmitted carrier frequency, a received carrier frequency, The dividing value which receives the serial data of a communication link baud rate clock value, decodes this received serial data, and generates the above-mentioned reference clock value is set as the above-mentioned dividing means. The dividing value which generates the above-mentioned transmitted carrier frequency is set as the above-mentioned transmitting carrier generation means. It consists of setting means to set the dividing value which generates the above-mentioned received carrier frequency as the above-mentioned receiving carrier generation means, and to set the dividing value which generates the above-mentioned communication link baud rate clock value as the above-mentioned communication link baud rate generation means.

[0010] In a reader writer with the controlling element which the reader writer of this invention specifies the identification information given to two or more communication link condition information, and determines communication link conditions A dividing means to carry out dividing of the clock inputted from the outside, and to generate a reference clock, A transmitting carrier generation means to generate a transmitting carrier by the reference clock generated with this dividing means, A receiving carrier generation means to generate a receiving carrier by the reference clock generated with the above-mentioned dividing means, A communication link baud rate generation means to generate a communication link baud rate clock by the reference clock generated with the above-mentioned dividing means, A reference clock value, a transmitted carrier frequency, a received carrier frequency, and a storage means by which two or more communication link condition information that identification information was given to communication link condition information including a communication link baud rate clock value is memorized beforehand; Receive the identification information which specifies the communication link conditions determined by the above-mentioned controlling element, and the above-mentioned storage means is searched using this identification information that received. The reference clock value generated with the above-mentioned dividing means as communication link condition information retrieved and called is set as the above-mentioned dividing means. The transmitted carrier frequency generated with the above-mentioned transmitting carrier generation means is set as the above-mentioned transmitting carrier generation means. It consists of setting means to set the received carrier frequency generated with the above-mentioned receiving carrier generation means as the above-mentioned receiving carrier generation means, and to set the communication link baud rate clock value generated with the above-mentioned communication link baud rate generation means as the above-mentioned communication link baud rate generation means.

[0011] In a reader writer with the controlling element which determines the identification information by which the reader writer of this invention was given to two or more communication link condition information A dividing means to carry out dividing of the clock inputted from the outside, and to generate a reference clock, A transmitting carrier generation means to carry out dividing of the reference clock generated with this dividing means, and to generate a transmitting carrier, A receiving carrier generation means to carry out dividing of the reference clock generated with the above-mentioned dividing means, and to generate a receiving carrier, A communication link baud rate generation means to carry out dividing of the reference clock generated with the above-mentioned dividing means, and to generate a communication link baud rate clock, A reference clock value, a transmitted carrier frequency, a received carrier frequency, and a storage means by which two or more communication link conditions that identification information was given to communication link condition information including the dividing value which generates a communication link baud rate clock value are memorized beforehand, Receive the

identification information which specifies the communication link conditions determined by the above-mentioned controlling element, and the above-mentioned storage means is searched using this identification information that received. The dividing value which generates the reference clock value as communication link condition information retrieved and called is set as the above-mentioned dividing means. The dividing value which generates a transmitted carrier frequency is set as the above-mentioned transmitting carrier generation means. It consists of setting means to set the dividing value which generates a received carrier frequency as the above-mentioned receiving carrier generation means, and to set the dividing value which generates a communication link baud rate clock value as the above-mentioned communication link baud rate generation means.

[0012] In the reader writer which the reader writer of this invention has the controlling element which determines a reference clock value, a transmitted carrier frequency, a received carrier frequency, and a communication link baud rate clock value, and performs a wireless card and radio A dividing means to carry out dividing of the clock inputted from the outside, and to generate a reference clock, A transmitting carrier generation means to generate a transmitting carrier by the reference clock generated with this dividing means, A receiving carrier generation means to generate a receiving carrier by the reference clock generated with the above-mentioned dividing means, A communication link baud rate generation means to generate a communication link baud rate clock by the reference clock generated with the above-mentioned dividing means, The reference clock value determined by the above-mentioned controlling element, a transmitted carrier frequency, a received carrier frequency, Receive the information on a communication link baud rate clock value, and the reference clock value generated with the above-mentioned dividing means based on this received information is set as the above-mentioned dividing means. The transmitted carrier frequency generated with the above-mentioned transmitting carrier generation means is set as the above-mentioned transmitting carrier generation means. A setting means to set the received carrier frequency generated with the above-mentioned receiving carrier generation means as the above-mentioned receiving carrier generation means, and to set the communication link baud rate clock value generated with the above-mentioned communication link baud rate generation means as the above-mentioned communication link baud rate generation means, The transmitting carrier generated with the above-mentioned transmitting carrier generation means set up with this setting means, The communication link baud rate clock generated with the above-mentioned communication link baud rate generation means, and a transmission-control means to generate modulation data from the transmit data transmitted from the above-mentioned controlling element, The receiving carrier generated with the above-mentioned receiving carrier generation means set up with the above-mentioned setting means, A reception-control means to generate recovery data from the received data received from the communication link baud rate clock generated with the above-mentioned communication link baud rate generation means, and the above-mentioned wireless card, It consists of control means which control data processing to the above-mentioned transmit data to the above-mentioned transmission-control means, and control data processing to the above-mentioned recovery data to the above-mentioned reception-control means.

[0013] The communication link conditioning approach of the reader writer this invention It is the communication link conditioning approach of a reader writer with the controlling element which determines a reference clock value, a transmitted carrier frequency, a received carrier frequency, and a communication link baud rate clock value. The step which carries out dividing of the clock inputted from the outside, and generates a reference clock, The step which generates a transmitting carrier by this reference clock, and the step which generates a receiving carrier by the above-mentioned reference clock, The step which generates a communication link baud rate clock by the above-mentioned reference clock, The reference clock value determined by the above-mentioned controlling element, a transmitted carrier frequency, a received carrier frequency, Receive the information on a communication link baud rate clock value, and the above-mentioned reference clock value which carries out generation is set up based on this received information. It is characterized by consisting of a step which sets up the above-mentioned transmitted carrier frequency which carries out generation, sets up the above-mentioned received carrier frequency which carries out generation, and sets up the above-mentioned communication link baud rate clock value which carries out generation.

[0014] The communication link conditioning approach of the reader writer this invention It is the communication link conditioning approach of a reader writer with the controlling element which determines a reference clock value, a transmitted carrier frequency, a received carrier frequency, and a communication link baud rate clock value. The step which carries out dividing of the clock inputted from the outside, and generates a reference clock, The step which carries out dividing of this reference clock, and generates a transmitting carrier, and the step which carries out dividing of the above-mentioned reference clock, and generates a receiving carrier, The step which carries out dividing of the above-mentioned reference clock, and generates a

communication link baud rate clock, The reference clock value determined by the above-mentioned controlling element, a transmitted carrier frequency, a received carrier frequency, The dividing value which receives the serial data of a communication link baud rate clock value, decodes this received Syria ** data, and generates the above-mentioned reference clock value is set up. It is characterized by consisting of a step which sets up the dividing value which generates the above-mentioned transmitted carrier frequency, sets up the dividing value which generates the above-mentioned received carrier frequency, and sets up the dividing value which generates the above-mentioned communication link baud rate clock value.

[0015] The communication link conditioning approach of the reader writer this invention The step which carries out dividing of the clock which is the communication link conditioning approach of a reader writer with the controlling element which specifies the identification information given to two or more communication link condition information, and determines communication link conditions, and is inputted from the outside, and generates a reference clock, The step which generates a transmitting carrier by this reference clock, and the step which generates a receiving carrier by the above-mentioned reference clock, The step which generates a communication link baud rate clock by the above-mentioned reference clock, The step which memorizes beforehand two or more communication link condition information that identification information was given to communication link condition information including a reference clock value, a transmitted carrier frequency, a received carrier frequency, and a communication link baud rate clock value, Receive the identification information which specifies the communication link conditions determined by the above-mentioned controlling element, search the identification information which is carrying out [above-mentioned] storage using this identification information that received, and communication link condition information is called. It carries out setting up the above-mentioned reference clock value which is included in this communication link condition information and which carries out generation, setting up the above-mentioned transmitted carrier frequency which carries out generation, setting up the above-mentioned received carrier frequency which carries out generation, and becoming from the step set up about the above-mentioned communication link baud rate clock value which carries out generation as the description.

[0016] The communication link conditioning approach of the reader writer this invention The step which carries out dividing of the clock which is the communication link conditioning approach of a reader writer with the controlling element which determines the identification information given to two or more communication link condition information, and is inputted from the outside, and generates a reference clock, The step which carries out dividing of this reference clock, and generates a transmitting carrier, and the step which carries out dividing of the above-mentioned reference clock, and generates a receiving carrier, The step which carries out dividing of the above-mentioned reference clock, and generates a communication link baud rate clock, The step which memorizes beforehand two or more communication link conditions that identification information was given to communication link condition information including the dividing value which generates a reference clock value, a transmitted carrier frequency, a received carrier frequency, and a communication link baud rate clock value, Receive the identification information which specifies the communication link conditions determined by the above-mentioned controlling element, search the identification information which is carrying out [above-mentioned] storage using this identification information that received, and communication link condition information is called. this connoisseur -- it is characterized by consisting of a step which sets up the dividing value which generates the reference clock value included in principle ******, sets up the dividing value which generates a transmitted carrier frequency, sets up the dividing value which generates a received carrier frequency, and sets up the dividing value which generates a communication link baud rate clock value.

[0017] The communication link conditioning approach of the reader writer this invention It has the controlling element which determines a reference clock value, a transmitted carrier frequency, a received carrier frequency, and a communication link baud rate clock value. The step which carries out dividing of the clock which is the communication link conditioning approach of the reader writer which performs a wireless card and radio, and is inputted from the outside, and generates a reference clock, The step which generates a transmitting carrier by this reference clock, and the step which generates a receiving carrier by the above-mentioned reference clock, The step which generates a communication link baud rate clock by the above-mentioned reference clock, The reference clock value determined by the above-mentioned controlling element, a transmitted carrier frequency, a received carrier frequency, Receive the information on a communication link baud rate clock value, and the above-mentioned reference clock value which carries out generation is set up based on this received information. The step which sets up the above-mentioned transmitted carrier frequency which carries out generation, sets up the above-mentioned received carrier frequency which carries out generation, and

sets up the above-mentioned communication link baud rate clock value which carries out generation, The transmitting carrier generated by the transmitted carrier frequency by which a setup was carried out [above-mentioned], the communication link baud rate clock generated with the communication link baud rate clock value by which a setup was carried out [above-mentioned], The step which generates modulation data from the transmit data transmitted from the above-mentioned controlling element, The step which generates recovery data from the received data received from the receiving carrier generated by the received carrier frequency by which a setup was carried out [above-mentioned], the communication link baud rate clock generated with the above-mentioned communication link baud rate clock value, and the above-mentioned wireless card, It is characterized by consisting of a step which controls data processing to the above-mentioned transmit data, and controls data processing to the above-mentioned recovery data.

[0018]

[Embodiment of the Invention] Hereafter, the gestalt of 1 implementation of this invention is explained with reference to a drawing.

[0019] Drawing 1 shows the outline configuration of the wireless card processing system concerning this invention.

[0020] That is, the wireless card processing system is constituted by the wireless (IC) card 4 which performs radio, and — between the personal computer (PC) 1 as high order equipment, and the antenna section 3 of the reader writer (R/W) 2 connected to this PC1, and this reader writer 2.

[0021] PC1 is constituted by the control section which is not illustrated, the control unit, the display, and the connection of the reader writer 2.

[0022] The reader writer 2 is constituted by MPU5 as a control circuit (controlling element) which controls the whole reader writer 2, LSI6 for the wireless card reader writers as an interface, the transceiver circuit 7, the antenna section 3, and the input-clock frequency divider 21.

[0023] MPU5 memorizes CPU11 which controls whole MPU5, a control program, and various ****, and is constituted by S1013 the input of the serial data for the communication link with the memory 12 and LSI6 which consist of RAM and a ROM, and for output.

[0024] It connects with the above PC 1, an exchange of data is performed, and CPU11 transmits a data lead command to LSI6 to reception of a data lead command.

[0025] The I/O Port the I/O Port of ** and for the serial input (data SI) serial output data (SO), the I/O Port for serial clocks (SCK), and the I/O Port for control signals (CONT) are formed in the above S1013.

[0026] the above S1013 — the data lead command of the wireless card 4 — the I/O Port for SI — mustard — it outputs to SI6.

[0027] The antenna section 3 is constituted by the transmitting antenna 14 and the receiving antenna 15.

[0028] The above-mentioned transceiver circuit 7 is constituted by the sending circuit 16 and the receiving circuit 17.

[0029] The wireless card 4 is constituted by the memory which memorizes various information, such as a control circuit which controls the whole, a control program, a random number, and ID (recognition number) data, the modulation demodulator circuit, the power-source generating circuit, and the transceiver antenna.

[0030] Drawing 2 shows the outline configuration of LSI6. LSI6 consists of the input-clock frequency divider 21, MPUI/F22, the transmitting carrier generation circuit 23, the receiving carrier generation circuit 24, a communication link baud rate generation circuit 25, a transmission-control circuit (modulation circuit) 26, and a reception-control circuit (demodulator circuit) 27.

[0031] The input-clock frequency divider 21 carries out dividing of the external clock inputted into the reader writer 2, and generates the clock used as the criteria of a system. For example, the function of the general-purpose reader writer by this invention can be made into that more flexible by establishing the dividing value of 1/1 / 1.5, 1/2, and a 1 / 4 grades. [1 and 1]

[0032] The MPUI/F circuit 22 is an interface (I/F) circuit for software to perform automatically a setup of each register of the above-mentioned input-clock frequency divider 21, the transmitting carrier generation circuit 23, the receiving carrier generation circuit 24, and the communication link baud rate generation circuit 25 through the serial terminal of MPU5. By receiving and decoding the serial data from MPU5, each register of the above-mentioned input-clock frequency divider 21, the transmitting carrier generation circuit 23, the receiving carrier generation circuit 24, and the communication link baud rate generation circuit 25 is set up.

[0033] The transmitting carrier generation circuit 23 is for setting up the transmitted carrier frequency to the wireless card 4 from the reference clock generated in the input-clock frequency divider 21. It realizes by carrying out dividing of the reference clock to any value.

[0034] The receiving carrier generation circuit 24 is for setting up the received carrier frequency of the received data from the wireless card 4 from the reference clock generated in the input-clock frequency divider 21. It realizes by carrying out dividing

of the reference clock to any value.

[0035] The communication link baud rate generation circuit 25 is for setting up a communication link baud rate clock (one 16 times the frequency of a baud rate) with the wireless card 4 from the reference clock generated in the input-clock frequency divider 21. It realizes by carrying out dividing of the reference clock to any value.

[0036] The transmission-control circuit 26 is a circuit which generates the modulation data to the wireless card 4 with the transmitting carrier generated in the transmitting carrier generation circuit 23, the communication link baud rate clock generated in the communication link baud rate generation circuit 25, and the transmit data from the MPUI/F circuit 22.

[0037] The reception-control circuit 27 is a circuit which generates the recovery data to MPU5 with the received data from the wireless card 4, the receiving carrier generated in the receiving carrier generation circuit 24, and the communication link baud rate clock generated in the communication link baud rate generation circuit 25.

[0038] Next, in such a configuration, actuation of the reader writer 2 is explained with reference to the flow chart of drawing 3 .

[0039] When a power source is switched on (ST1), the MPUI/F circuit 22 judges the initial communicate mode as a communications protocol with MPU5 (ST2).

[0040] According to this judgment, the MPUI/F circuit 22 receives communication link condition information through serial communication from MPU5. Decode the received communication link condition information and the dividing value of the input-clock frequency divider 21 is set up based on this decoded communication link condition (ST3). The transmitted carrier frequency of the transmitting carrier generation circuit 23 is set up (ST4), the received carrier frequency of the receiving carrier generation circuit 24 is set up (ST5), and the communication link baud rate of the communication link baud rate generation circuit 25 is set up (ST6).

[0041] And from MPU5, the MPUI/F circuit 22 receives the information on the other modes through serial communication, sets up the other modes (ST7), confirms all setup (ST8), and starts the communication link with the wireless card 4 (ST22).

[0042] Communication link conditions with the wireless card 4 are set up by the routine of the step 3-STs 6 mentioned above. However, this order of a setup does not ask. These setup is automatically performed after powering on by the software memorized by the memory 12 of MPU5 using serial I/F of MPU5.

[0043] Next, the 1st example in the reader writer 2 constituted concretely is explained with reference to drawing 4 . A setup of the reader writer 2 for enabling the communication link with the wireless card 4 which operates on the following communication link conditions is as follows.

[0044] communication link condition input-clock frequency: — 16MHz transmitted carrier frequency: — 125kHz received carrier frequency: — 62.5kHz communication link baud rate: — 7800 bpsMPUI/F circuits 22 follow the flow shown by drawing 3 , and set up the reader writer 2. First, in setting up each register in a step 3-STs 6, MPU5 decides what kind of value to set up beforehand.

[0045] Then, it receives through serial communication from MPU5, and the MPUI/F circuit 22 sets up the value determined here to each register of the input-clock frequency divider 21, the transmitting carrier generation circuit 23, the receiving carrier generation circuit 24, and the communication link baud rate generation circuit 25.

[0046] A setup of each register to communication link conditions here is as follows.

[0047] a. Set the input-clock dividing value of the input-clock frequency divider 21 as one half, and generate the reference clock (8MHz) used as the base of actuation of the reader writer 2 from an input clock (16MHz).

[0048] b. In order to generate the transmitted carrier frequency (125kHz) to the reference clock generated in the input-clock frequency divider 21, set the dividing value of the transmitting carrier generation circuit 23 as 1/64.

[0049] c. In order to generate the received carrier frequency (62.5kHz) to the reference clock generated in the input-clock frequency divider 21, set the dividing value of the receiving carrier generation circuit 24 as 1/128.

[0050] d. In order to set up the communication link baud rate (7800bps) to the reference clock generated in the input-clock frequency divider 21, set the dividing value of the communication link baud rate generation circuit 25 as 1/64. The clock generated here is 16 times the frequency of a baud rate.

[0051] Thus, by setting up, the communication link with the wireless card 4 equipped with the above-mentioned communication link conditions is attained. However, the order of a setup of a, b, c, and d does not ask. Moreover, the set point (dividing value) of each register shown here is an example, and must not necessarily be set up in this way to the above-mentioned communication link conditions. A system construction person can specify the set point of each register as arbitration.

[0052] Next, the 2nd example in the reader writer 2 constituted concretely is explained with reference to drawing 5 . An input clock is changed into 8MHz to the communication link conditions shown by drawing 4 , and other conditions are the same as drawing 4 .

[0053] The MPUI/F circuit 22 follows the flow shown by drawing 3 , and sets up the

reader writer 2.

[0054] a. Set the input-clock dividing value of the input-clock frequency divider 21 as 1/1, and generate the reference clock (8MHz) used as the base of actuation of the reader writer 2 from an input clock (8MHz). In addition, about the dividing value of the b. transmitting carrier generation circuit 23, the dividing value of the c. receiving carrier generation circuit 24, and the dividing value of d. communication link baud rate generation circuit 25, it is the same as drawing 4 .

[0055] Thus, by setting up, the communication link with the wireless card 4 equipped with the above-mentioned communication link conditions is attained. However, the order of a setup of Above a, b, c, and d does not ask. Moreover, the set point (dividing value) of each register shown here is an example, and must not necessarily be set up in this way to the above-mentioned communication link conditions. A system construction person can specify the set point of each register as arbitration.

[0056] Next, the 3rd example in the reader writer 2 constituted concretely is explained with reference to drawing 6 . A setup of the reader writer 2 for enabling the communication link with the wireless card 4 which operates on the following communication link conditions is as follows.

[0057] communication link condition input-clock frequency: -- 13.56MHz transmitted carrier frequency: -- 3.322MHz received carrier frequency: -- 847.5kHz communication link baud rate: -- 106 kbpsMPUI/F circuits 22 follow the flow shown by drawing 3 , and set up the reader writer 2. First, in setting up each register in a step 3-STs 6, MPU5 decides what kind of value to set up beforehand.

[0058] Then, it receives through serial communication from MPU5, and the MPU1/F circuit 22 sets up the value determined here to each register of the input-clock frequency divider 21, the transmitting carrier generation circuit 23, the receiving carrier generation circuit 24, and the communication link baud rate generation circuit 25.

[0059] A setup of each register to communication link conditions here is as follows.

[0060] a. Set the input-clock dividing value of the input-clock frequency divider 21 as 1/1, and generate the reference clock (13.56MHz) used as the base of actuation of a reader writer from an input clock (13.56MHz).

[0061] b. In order to generate the transmitted carrier frequency (3.322MHz) to the reference clock generated in the input-clock frequency divider 21, set the dividing value of the transmitting carrier generation circuit 23 as one fourth.

[0062] c. In order to generate the received carrier frequency (847.5kHz) to the reference clock generated in the input-clock frequency divider 21, set the dividing value of the receiving carrier generation circuit 24 as 1/16.

[0063] d. In order to set up the communication link baud rate to the reference clock generated in the input-clock frequency divider 21 (106kbps), set the dividing value of the communication link baud rate generation circuit 25 as one eighth. The clock generated here is 16 times the frequency of a baud rate.

[0064] Thus, by setting up, the communication link with the wireless card 4 equipped with the above-mentioned communication link conditions is attained. However, the order of a setup of a, b, c, and d does not ask. moreover, the set point (dividing value) of each register shown here is an example, and is not necessarily set up in this way to the above-mentioned communication link conditions -- it can kick, and if it is **, there is not necessarily nothing. A system construction person can specify the set point of each register as arbitration.

[0065] Next, the 4th example adapting the configuration in the reader writer 2 is explained with reference to drawing 7 . In this example, the communication link conditioning data storage memory 28 is prepared as an additional function.

[0066] In order to confirm the reader writer 2 to the wireless card 4 which is operating by the radical of some communication link conditions as shown above, it is necessary to set up each setting register of a step 3-STs 6 from MPU5. Although the register is accessed and set up according to an individual, respectively, now, processing occurs repeatedly and it becomes complicated.

[0067] So, in this example, the communication link conditioning data storage memory 10 which made these setting information memorize beforehand is prepared, and it specifies which [of memory information] MPU5 confirms. The MPUI/F circuit 22 sets up a communication link condition register automatically from the specified memory information.

[0068] Here, processing actuation of **** 4 example is explained with reference to the flow chart of drawing 8 .

[0069] When a power source is switched on (ST11), the MPUI/F circuit 22 judges the initial communicate mode as a communications protocol with MPU5 (ST12).

[0070] According to assignment of which [of the memory information from MPU5] the MPUI/F circuit 22 confirms, memory information is called from the communication link conditioning data storage memory 28 (ST13). Decode the contents of this memory information (ST14), and the dividing value of the input-clock frequency divider 21 is set up based on this decoded communication link conditioning data (ST15). The transmitted carrier frequency of the transmitting carrier generation circuit 23 is set up (ST16), the received carrier frequency of the receiving carrier generation circuit 24

is set up (ST17), and the communication link baud rate of the communication link baud rate generation circuit 25 is set up (ST18).

[0071] And from MPU5, the MPUI/F circuit 22 sets up the other modes through serial communication (ST19), confirms all setup (ST20), and starts the communication link with the wireless card 4 (ST21).

[0072] Drawing 9 is the example of a configuration of the memory information stored in the communication link conditioning data storage memory 28. For example, when a specification is in ISO10xxx mode, the address is set up with the 00th street and the function (register set point) is set up with input clocks 1/1, the transmitting carriers 1/1, the receiving carriers 1/16, and baud rates 1/32.

[0073] In the example of a configuration of this memory information, register setting information is arranged in the communication link conditioning data storage memory 28 for every functional specifications. When making it a setup corresponding to ISO10xxx mode, MPU5 can set up the reader writer 2 by [of the communication link conditioning data storage memory 28] confirming the 00th street.

[0074] Drawing 10 is other examples of a configuration of the memory information stored in the communication link conditioning data storage memory 28. For example, in the case of input-clock:16MHz, transmitting carrier:125kHz, receiving carrier:62.5kHz, and communication link baud rate:7800bps, the address is set up with the 00th street and the function (register set point) is set up for the specification with input clocks 1/2, the transmitting carriers 1/64, the receiving carriers 1/128, and baud rates 1/64.

[0075] In the example of a configuration of this memory information, register setting information is arranged in the communication link conditioning data storage memory 28 for every communication link conditions. For example, by setting the communication link conditions shown by drawing 4 as the 00th street of the communication link conditioning data storage memory 28, if the 00th street is confirmed, a setup of the reader writer 2 will become the thing corresponding to this communication link condition which is the communication link conditioning data storage memory 10 from MPU5.

[0076] Next, the 5th example is explained with reference to drawing 11 .

[0077] The differences with drawing 2 in **** 5 example are the transmission-control circuit 31 and the reception-control circuit 32.

[0078] The transmission-control circuit (modulation circuit) 31 is a circuit which generates the modulation data to the wireless card 4 with the transmitting carrier generated in the transmitting carrier generation circuit 23, the communication link baud rate clock generated in the communication link baud rate generation circuit 25, and the transmit data from the MPUI/F circuit 22. Moreover, the existence of data processing is controllable by the data-processing control signal from the MPUI/F circuit 22 to transmit data.

[0079] Specifically, it is addition of 1 synchronous character data. At this time, the character value and character length of a synchronous character can specify it as arbitration from MPU5 separately.

[0080] 2) Addition of CRC operation data.

[0081] 3) Addition of a frame start character / frame termination character. Addition of a frame start/termination character can be specified according to an individual.

[0082] It has ******.

[0083] The reception-control circuit (demodulator circuit) 32 is a circuit which generates the recovery data to MPU5 with the received data from the wireless card 4, the receiving carrier generated in the receiving carrier generation circuit 24, and the communication link baud rate clock generated in the communication link baud rate generation circuit 25. Moreover, the existence of processing of data is controllable by the data-processing control signal from the MPUI/F circuit 22 to recovery data.

[0084] Specifically, it is deletion of 1 synchronous character data. At this time, the character value and character length of a synchronous character can specify it as arbitration from MPU5 separately.

[0085] 2) CRC operation acknowledgement function (error detection function).

[0086] 3) Deletion of a frame start character / frame termination character. Deletion of a frame start/termination character can be specified according to an individual.

[0087] It has ******.

[0088] Drawing 12 is the example of transmit data processing by the data-processing control signal in the transmission-control circuit 31. The radical data shown in (a) of drawing 12 are serial data transmitted from MPU5, and are these data which should be transmitted to the wireless card 4. Hereafter, six sorts of examples are shown and processing of the data to this radical data is explained. It is the example which is shown here to the last, and it is not what showed all realizable combination.

[0089] (b) shows the condition of the transmit data in the case of adding 1 byte of synchronous character. The synchronous character is added to the head of radical data. For example, the character of 92H is added.

[0090] (c) shows the condition of the transmit data in the case of adding 2 bytes of synchronous character. The synchronous character is added to the head of radical data. For example, the character of 9292H is added.

[0091] (d) shows the condition of the transmit data in the case of adding a CRC

operation. The CRC operation was performed to radical data and the result of an operation is added after the last data transmission of these data. For example, when calculating CRC16, the result of an operation is added to 16 bits.

[0092] (e) shows the condition of the transmit data in the case of adding an initiation frame (SOF) / termination frame (EOF) before and after radical data, respectively. For example, the "High level" of a triplet can be added from the "Low level" of 10 to 11 bits, and 2 as SOF. Moreover, the "Low level" of 10 to 11 bits can be added as EOF.

[0093] (f) shows the condition of the transmit data in the case of adding an initiation frame (SOF) to the anterior part of radical data.

[0094] (g) shows the condition of the transmit data in the case of adding a termination frame (EOF) to the posterior part of radical data.

[0095] Processing of the recovery data based on the data-processing control signal in the reception-control circuit 32 performs the reverse of transmit data processing shown in (b) - (g) of drawing 12 . For example, the recovery data which deleted only the synchronous character from the recovery data with which the synchronous character was added to the head are generated, and it transmits as serial data to MPU5 (radical data are generated from the data of (b) of drawing 12).

[0096] As explained above, according to the gestalt of implementation of the above-mentioned invention, the general-purpose reader writer corresponding to a wireless card with various communication link conditions (an input-clock frequency, a received carrier frequency, a transmitted carrier frequency, transceiver communication link baud rate) is realizable.

[0097] Moreover, by using a reader writer widely, the need of manufacturing the reader writer system corresponding to each wireless card according to an individual is lost, and development effectiveness and the effectiveness of a maintenance improve.

[0098] Moreover, a functional setting register can be performed through serial I/F of MPU, and since it has realized without adding an extraordinarily difficult function, it can master easily only by getting to know the fundamental operating instructions of MPU.

[0099] In addition, it becomes possible from MPU by storing information in memory also about each setting command about processing control of a transmitted and received data to set up automatically.

[Translation done.]

DESCRIPTION OF DRAWINGS

[Brief Description of the Drawings]

[Drawing 1] The block diagram showing the outline configuration of the wireless card processing system concerning this invention.

[Drawing 2] The block diagram showing the outline configuration of a reader writer.

[Drawing 3] The flow chart for explaining actuation of a reader writer.

[Drawing 4] Drawing showing the configuration of the 1st concrete example in a reader writer.

[Drawing 5] Drawing showing the configuration of the 2nd concrete example in a reader writer.

[Drawing 6] Drawing showing the configuration of the 3rd concrete example in a reader writer.

[Drawing 7] Drawing showing the 4th example adapting the configuration in a reader writer.

[Drawing 8] The flow chart for explaining processing actuation of a reader writer.

[Drawing 9] Drawing showing the example of a configuration of the memory information stored in communication link conditioning data storage memory.

[Drawing 10] Drawing showing the example of a configuration of memory **** stored in communication link conditioning data storage memory.

[Drawing 11] Drawing showing the configuration of the 5th example of a reader writer.

[Drawing 12] Drawing showing the example of transmit data processing by the data-processing control signal in a transmission-control circuit.

[Description of Notations]

1 -- High order equipment (PC)

2 -- Reader writer

4 -- Wireless card

5 — MPU (controlling element)

6 — LSI for wireless card reader writers

7 — Transceiver circuit

21 — Input-clock frequency divider (dividing means)

22 — MPUI/F (setting means)

23 — Transmitting carrier generation circuit (transmitting carrier generation means)

24 — Receiving carrier generation circuit (receiving carrier generation means)

25 — Communication link baud rate generation circuit (communication link baud rate generation means)

26 31 — Transmission-control circuit (transmission-control means)

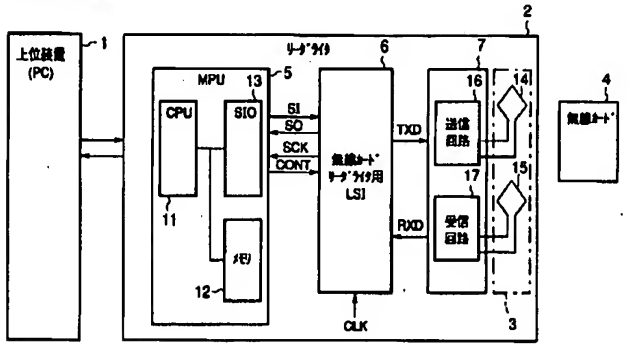
27 32 — Reception-control circuit (reception-control means)

28 — Communication link conditioning data storage memory (storage means)

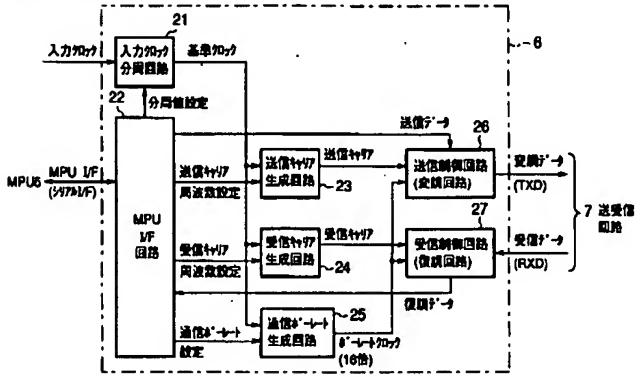
[Translation done.]

DRAWINGS

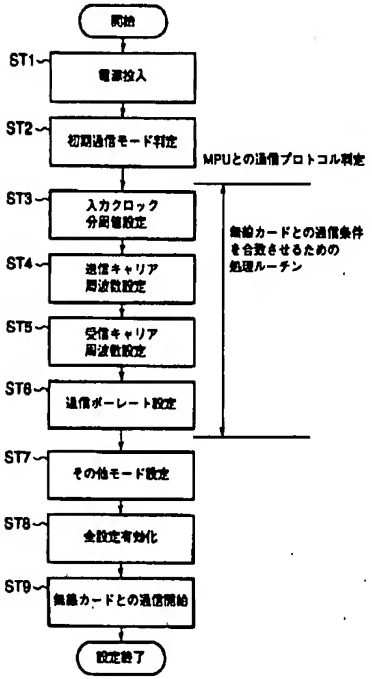
[Drawing 1]



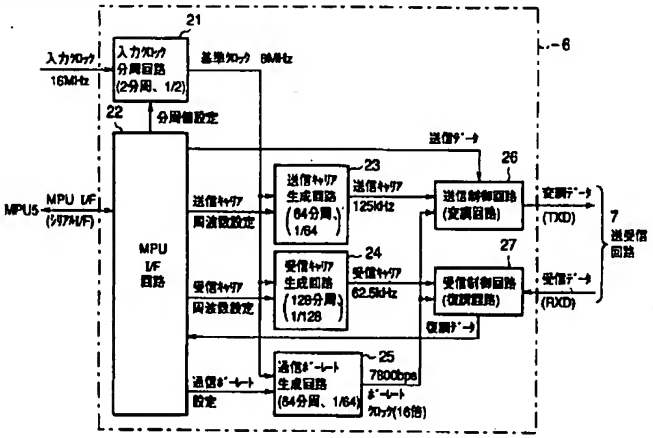
[Drawing 2]



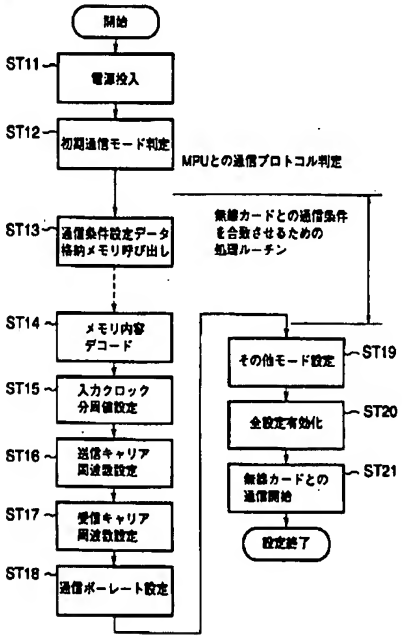
[Drawing 3]



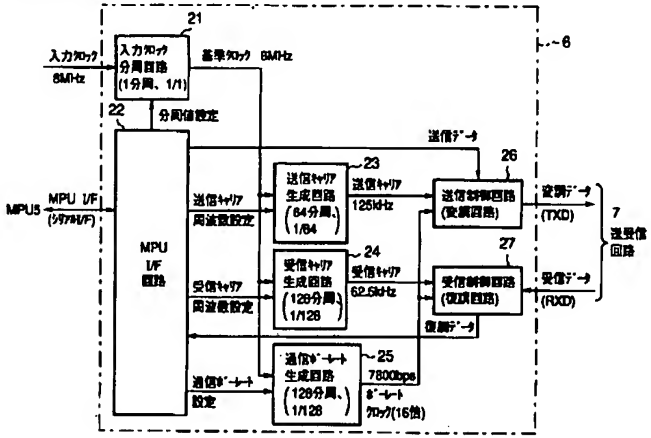
[Drawing 4]



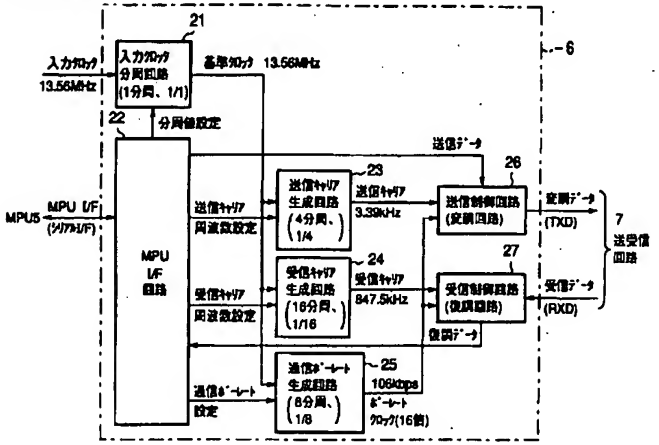
[Drawing 8]



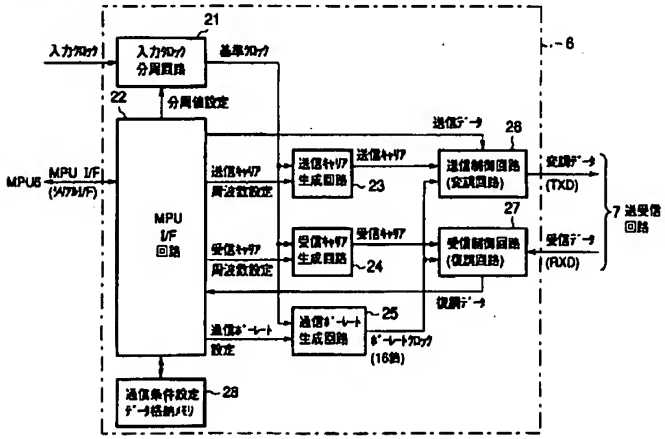
[Drawing 5]



[Drawing 6]



[Drawing 7]



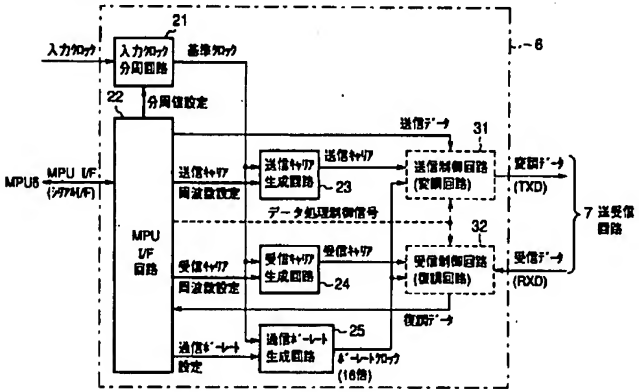
[Drawing 9]

仕様	アドレス	機能(レジスタ設定値)
ISO 10xxx モード	00	入力クロック 1/1 送信キャリア 1/1 受信キャリア 1/16 ボーレート 1/32
ISO 14xxx モード	01	入力クロック 1/1 送信キャリア 1/4 受信キャリア 1/16 ボーレート 1/8
A社向け モード1	02	入力クロック 1/2 送信キャリア 1/64 受信キャリア 1/128 ボーレート 1/64
A社向け モード2	03	入力クロック 1/1 送信キャリア 1/64 受信キャリア 1/128 ボーレート 1/64
B社向け モード	04	入力クロック 1/4 送信キャリア 1/8 受信キャリア 1/32 ボーレート 1/16
⋮	⋮	⋮

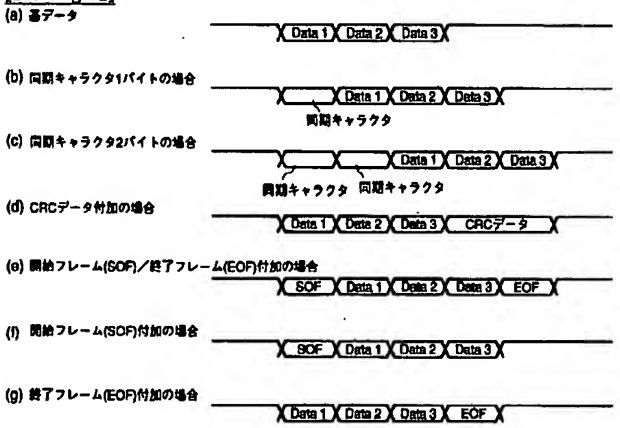
[Drawing 10]

仕様	アドレス	機能(レジスタ設定値)
入力クロック :16MHz 送信キャリア :125kHz 受信キャリア :62.5kHz 通信ボーレート:7800bps	00	入力クロック 1/1 送信キャリア 1/64 受信キャリア 1/128 ボーレート 1/64
入力クロック :6MHz 送信キャリア :125kHz 受信キャリア :62.5kHz 通信ボーレート:7800bps	01	入力クロック 1/1 送信キャリア 1/64 受信キャリア 1/128 ボーレート 1/64
入力クロック :13.56MHz 送信キャリア :3.39MHz 受信キャリア :847.5kHz 通信ボーレート:106kbps	11	入力クロック 1/1 送信キャリア 1/4 受信キャリア 1/16 ボーレート 1/8
⋮	⋮	⋮

[Drawing 11]



[Drawing 12]



[Translation done.]

(19)日本国特許庁（ＪＰ）　(12)公開特許公報（Ａ）　(11)特許出願公開番号
特開2001－126038
（P2001－126038A）
(43)公開日　平成13年5月11日(2001.5.11)

(51)Int.Cl.'	識別記号	ＦＩ		テーマコード'（参考）
Ｇ０６Ｋ　17/00		Ｇ０６Ｋ　17/00	Ｆ	５Ｂ０１４
			Ｎ	５Ｂ０５８
Ｇ０６Ｆ　3/00		Ｇ０６Ｆ　3/00	Ｃ	５Ｋ００４
13/12	３４０	13/12	３４０Ｅ	５Ｋ０３４
Ｈ０４Ｌ　29/06		Ｈ０４Ｌ　13/00	３０５Ｃ	

審査請求　未請求　請求項の数11　ＯＬ　（全 15 頁）　最終頁に続く

(21)出願番号　特願平11－310297

(22)出願日　平成11年10月29日(1999.10.29)

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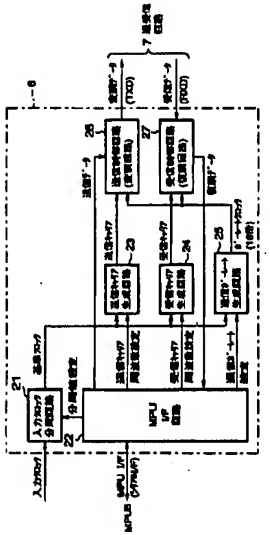
最終頁に続く

(54)【発明の名称】　リーダライタとリーダライタの通信条件設定方法

(57)【要約】
【課題】　さまざまな通信条件に対応する汎用性を持たせ、開発効率およびメンテナンスの効率を向上させる。
【解決手段】　電源が投入された際、ＭＰＵＩ／Ｆ回路２２は、ＭＰＵ５との通信プロトコルとしての初期通信モードの判定を行い、ＭＰＵ５よりシリアル通信を介して通信条件情報を受信し、受信した通信条件情報をデコードし、このデコードした通信条件に基づいて入力クロック分周回路２１の分周値を設定し、送信キャリア生成回路２３の送信キャリア周波数字設定し、受信キャリア生成回路２４の受信キャリア周波数を設定し、通信ボーレート生成回路２５の通信ボーレートを設定し、さらにＭＰＵ５よりシリアル通信を介してその他のモードの情報を受信し、その他のモードを設定し、全設定を有効にして無線カードとの通信を開始する。



【特許請求の範囲】

【請求項１】　基準クロック値、送信キャリア周波数、受信キャリア周波数、通信ボーレートクロック値を決定する制御素子を有したリーダライタにおいて、外部から入力されるクロックを分周して基準クロックを生成する分周手段と、この分周手段で生成された基準クロックにより送信キャリアを生成する送信キャリア生成手段と、上記分周手段で生成された基準クロックにより受信キャリアを生成する受信キャリア生成手段と、上記分周手段で生成された基準クロックにより通信ボーレートクロックを生成する通信ボーレート生成手段と、上記制御素子で決定された基準クロック値、送信キャリア周波数、受信キャリア周波数、通信ボーレートクロック値の情報を受信し、この受信した情報に基づいて上記分周手段で生成する基準クロック値を上記分周手段に設定し、上記送信キャリア生成手段で生成する送信キャリア周波数を上記送信キャリア生成手段に設定し、上記受信キャリア生成手段で生成する受信キャリア周波数を上記受信キャリア生成手段に設定し、上記通信ボーレート生成手段で生成する通信ボーレートクロック値を上記通信ボーレート生成手段に設定する設定手段と、を具備したことを特徴とするリーダライタ。

【請求項２】　基準クロック値、送信キャリア周波数、受信キャリア周波数、通信ボーレートクロック値を決定する制御素子を有したリーダライタにおいて、外部から入力されるクロックを分周して基準クロックを生成する分周手段と、この分周手段で生成された基準クロックを分周して送信キャリアを生成する送信キャリア生成手段と、上記分周手段で生成された基準クロックを分周して受信キャリアを生成する受信キャリア生成手段と、上記分周手段で生成された基準クロックを分周して通信ボーレートクロックを生成する通信ボーレート生成手段と、上記制御素子で決定された基準クロック値、送信キャリア周波数、受信キャリア周波数、通信ボーレートクロック値のシリアルデータを受信し、この受信したシリアルデータを解読して上記基準クロック値を生成する分周値を上記分周手段に設定し、上記送信キャリア周波数を生成する分周値を上記送信キャリア生成手段に設定し、上記受信キャリア周波数を生成する分周値を上記受信キャリア生成手段に設定し、上記通信ボーレートクロック値を生成する分周値を上記通信ボーレート生成手段に設定する設定手段と、を具備したことを特徴とするリーダライタ。

【請求項３】　複数の通信条件情報に付与された識別情報を指定して通信条件を決定する制御素子を有したリーダライタにおいて、外部から入力されるクロックを分周して基準クロックを生成する分周手段と、この分周手段で生成された基準クロックにより送信キャリアを生成する送信キャリア生成手段と、上記分周手段で生成された基準クロックにより受信キャリアを生成する受信キャリア生成手段と、上記分周手段で生成された基準クロックにより通信ボーレートクロックを生成する通信ボーレート生成手段と、基準クロック値、送信キャリア周波数、受信キャリア周波数、通信ボーレートクロック値を含む通信条件情報に識別情報が付与された複数の通信条件情報を予め記憶している記憶手段と、上記制御素子で決定された通信条件を指定する識別情報を受信し、この受信した識別情報を用いて上記記憶手段を検索し、検索して呼び出した通信条件情報としての上記分周手段で生成する基準クロック値を上記分周手段に設定し、上記送信キャリア生成手段で生成する送信キャリア周波数を上記送信キャリア生成手段に設定し、上記受信キャリア生成手段で生成する受信キャリア周波数を上記受信キャリア生成手段に設定し、上記通信ボーレート生成手段で生成する通信ボーレートクロック値を上記通信ボーレート生成手段に設定する設定手段と、を具備したことを特徴とするリーダライタ。

【請求項４】　複数の通信条件情報に付与された識別情報を決定する制御素子を有したリーダライタにおいて、外部から入力されるクロックを分周して基準クロックを生成する分周手段と、この分周手段で生成された基準クロックを分周して送信キャリアを生成する送信キャリア生成手段と、上記分周手段で生成された基準クロックを分周して受信キャリアを生成する受信キャリア生成手段と、上記分周手段で生成された基準クロックを分周して通信ボーレートクロックを生成する通信ボーレート生成手段と、基準クロック値、送信キャリア周波数、受信キャリア周波数、通信ボーレートクロック値を生成する分周値を含む通信条件情報に識別情報が付与された複数の通信条件を予め記憶している記憶手段と、上記制御素子で決定された通信条件を指定する識別情報を受信し、この受信した識別情報を用いて上記記憶手段を検索し、検索して呼び出した通信条件情報としての基準クロック値を生成する分周値を上記分周手段に設定し、送信キャリア周波数を生成する分周値を上記送信キャリア生成手段に設定し、受信キャリア周波数を生成する分周値を上記受信キャリア生成手段に設定し、通信ボーレートクロック値を生成する分周値を上記通信ボーレート生成手段に設定する設定手段と、を具備したことを特徴とするリーダライタ。

【請求項５】　基準クロック値、送信キャリア周波数、受信キャリア周波数、通信ボーレートクロック値を決定する制御素子を有して、無線カードと無線通信を行うリーダライタにおいて、外部から入力されるクロックを分周して基準クロックを生成する分周手段と、この分周手段で生成された基準クロックにより送信キャリアを生成する送信キャリア生成手段と、上記分周手段で生成された基準クロックにより受信キャリアを生成する受信キャリア生成手段と、上記分周手段で生成された基準クロックにより通信ボーレートクロックを生成する通信ボーレ

ート生成手段と、上記制御素子で決定された基準クロック値、送信キャリア周波数、受信キャリア周波数、通信ボーレートクロック値の情報を受信し、この受信した情報に基づいて上記分周手段で生成する基準クロック値を上記分周手段に設定し、上記送信キャリア生成手段で生成する送信キャリア周波数を上記送信キャリア生成手段に設定し、上記受信キャリア生成手段で生成する受信キャリア周波数を上記受信キャリア生成手段に設定し、上記通信ボーレート生成手段で生成する通信ボーレートクロック値を上記通信ボーレート生成手段に設定する設定手段と、この設定手段で設定された上記送信キャリア生成手段で生成される送信キャリア、上記通信ボーレート生成手段で生成される通信ボーレートクロック、上記制御素子から送信される送信データとから変調データを生成する送信制御手段と、上記設定手段で設定された上記受信キャリア生成手段で生成される受信キャリア、上記通信ボーレート生成手段で生成される通信ボーレートクロック、上記無線カードから受信した受信データとから復調データを生成する受信制御手段と、上記送信制御手段に対して上記送信データに対するデータ加工を制御し、上記受信制御手段に対して上記復調データに対するデータ加工を制御する制御手段と、を具備したことを特徴とするリーダライタ。

【請求項6】 上記制御手段で制御されるデータ加工は、同期キャラクタデータの付加・削除、CRC演算データの付加・削除、フレーム開始／フレーム終了キャラクタの付加・削除、及びこれらの組み合わせであることを特徴とする請求項5記載のリーダライタ。

【請求項7】 基準クロック値、送信キャリア周波数、受信キャリア周波数、通信ボーレートクロック値を決定する制御素子を有したリーダライタの通信条件設定方法であって、外部から入力されるクロックを分周して基準クロックを生成するステップと、この基準クロックにより送信キャリアを生成するステップと、上記基準クロックにより受信キャリアを生成するステップと、上記基準クロックにより通信ボーレートクロックを生成するステップと、上記制御素子で決定された基準クロック値、送信キャリア周波数、受信キャリア周波数、通信ボーレートクロック値の情報を受信し、この受信した情報に基づいて上記生成する基準クロック値を設定し、上記生成する送信キャリア周波数を設定し、上記生成する受信キャリア周波数を設定し、上記生成する通信ボーレートクロック値を設定するステップと、からなることを特徴とするリーダライタの通信条件設定方法。

【請求項8】 基準クロック値、送信キャリア周波数、受信キャリア周波数、通信ボーレートクロック値を決定する制御素子を有したリーダライタの通信条件設定方法であって、外部から入力されるクロックを分周して基準クロックを生成するステップと、この基準クロックを分周して送信キャリアを生成するステップと、上記基準クロックを分周して受信キャリアを生成するステップと、上記基準クロックを分周して通信ボーレートクロック値のシリアルデータを受信し、この受信したシリアルデータを解読して上記基準クロック値を生成する分周値を設定し、上記送信キャリア周波数を生成する分周値を設定し、上記受信キャリア周波数を生成する分周値を設定し、上記通信ボーレートクロック値を生成する分周値を設定するステップと、からなることを特徴とするリーダライタの通信条件設定方法。

【請求項9】 複数の通信条件情報に付与された識別情報を指定して通信条件を決定する制御素子を有したリーダライタの通信条件設定方法であって、外部から入力されるクロックを分周して基準クロックを生成するステップと、この基準クロックにより送信キャリアを生成するステップと、上記基準クロックにより受信キャリアを生成するステップと、上記基準クロックにより通信ボーレートクロックを生成するステップと、基準クロック値、送信キャリア周波数、受信キャリア周波数、通信ボーレートクロック値を含む通信条件情報に識別情報が付与された複数の通信条件情報を予め記憶するステップと、上記制御素子で決定された通信条件を指定する識別情報を受信し、この受信した識別情報を用いて上記記憶している識別情報を検索して通信条件情報を呼び出し、この通信条件情報に含まれる上記生成する基準クロック値を設定し、上記生成する送信キャリア周波数を設定し、上記生成する受信キャリア周波数を設定し、上記生成する通信ボーレートクロック値を設定するステップと、からなることを特徴とするリーダライタの通信条件設定方法。

【請求項10】 複数の通信条件情報に付与された識別情報を決定する制御素子を有したリーダライタの通信条件設定方法であって、外部から入力されるクロックを分周して基準クロックを生成するステップと、この基準クロックを分周して送信キャリアを生成するステップと、上記基準クロックを分周して受信キャリアを生成するステップと、上記基準クロックを分周して通信ボーレートクロックを生成するステップと、基準クロック値、送信キャリア周波数、受信キャリア周波数、通信ボーレートクロック値を生成する分周値を含む通信条件情報に識別情報が付与された複数の通信条件を予め記憶するステップと、上記制御素子で決定された通信条件を指定する識別情報を受信し、この受信した識別情報を用いて上記記憶している識別情報を検索して通信条件情報を呼び出し、この通信条作情報に含まれる基準クロック値を生成する分周値を設定し、送信キャリア周波数を生成する分周値を設定し、受信キャリア周波数を生成する分周値を設定し、通信ボーレートクロック値を生成する分周値を設定するステップと、からなることを特徴とするリーダライタの通信条件設定方法。

【請求項11】 基準クロック値、送信キャリア周波数、受信キャリア周波数、通信ボーレートクロック値を決定する制御素子を有して、無線カードと無線通信を行うリーダライタの通信条件設定方法であって、外部から入力されるクロックを分周して基準クロックを生成するステップと、この基準クロックにより送信キャリアを生成するステップと、上記基準クロックにより受信キャリアを生成するステップと、上記基準クロックにより通信ボーレートクロックを生成するステップと、上記制御素子で決定された基準クロック値、送信キャリア周波数、受信キャリア周波数、通信ボーレートクロック値の情報を受信し、この受信した情報に基づいて上記生成する基準クロック値を設定し、上記生成する送信キャリア周波数を設定し、上記生成する受信キャリア周波数を設定し、上記生成する通信ボーレートクロック値を設定するステップと、上記設定された送信キャリア周波数で生成される送信キャリア、上記設定された通信ボーレートクロック値で生成される通信ボーレートクロック、上記制御素子から送信される送信データとから変調データを生成するステップと、上記設定された受信キャリア周波数で生成される受信キャリア、上記通信ボーレートクロック値で生成される通信ボーレートクロック、上記無線カードから受信した受信データとから復調データを生成するステップと、上記送信データに対するデータ加工を制御し、上記復調データに対するデータ加工を制御するステップと、からなることを特徴とするリーダライタの通信条件設定方法。

【発明の詳細な説明】

【0001】

【発明の属する技術分野】この発明は、上位装置と無線カードとの間でデータのやり取りを行い、これらとのインターフェースと全体を制御するMPUとからなるリーダライタとリーダライタの通信条件設定方法に関する。

【0002】

【従来の技術】従来、無線カード用の無線カード処理システムは、ホスト（上位装置、PC）とリーダライタ（R／W）と無線カードとからなる。上記リーダライタは、ホスト（PC）と無線カードとを接続するものである。このリーダライタは、全体を制御するMPUとLS1からなるインターフェースと送受信回路とにより構成されている。

【0003】無線（IC）カードは、その種類個々により様々な通信条件で動作している。これまでこれら無線カードとの通信を行うためのリーダライタは、無線カードの通信条件に合致した通信モードを持ったものを各々製作していた。従って、Aという通信条件を有した無線カードにはA'というリーダライタを、Bという通信条件を有した無線カードにはB'というリーダライタを用意する必要がある。

【0004】ここで言う通信条件とは、「受信キャリア周波数」、「送信キャリア周波数」、「送受信通信ボーレート」のことである。

【0005】しかしながら、無線カードそれぞれの通信条件に合わせてリーダライタを作ることは開発効率が大変悪い。また、通信条件のみが異なるだけで、その他の機能が全く同等のリーダライタを無線カードの種類分だけ作り込むことは技術的には問題無いが、開発効率およびメンテナンス面では大変な労力が発生し効率が悪くなるという問題があった。

【0006】

【発明が解決しようとする課題】上記したように、無線カードそれぞれの通信条件に合わせてリーダライタを作ることは開発効率が大変悪く、通信条件のみが異なるだけで、その他の機能が全く同等のリーダライタを無線カードの種類分だけ作り込むことは技術的には問題無いが、開発効率およびメンテナンス面では大変な労力が発生し効率が悪くなるという問題があった。

【0007】そこで、この発明は、さまざまな通信条件に対応する汎用性を持たせ、開発効率およびメンテナンスの効率を向上させることのできるリーダライタとリーダライタの通信条件設定方法を提供することを目的とする。

【0008】

【課題を解決するための手段】この発明のリーダライタは、基準クロック値、送信キャリア周波数、受信キャリア周波数、通信ボーレートクロック値を決定する制御素子を有したリーダライタにおいて、外部から入力されるクロックを分周して基準クロックを生成する分周手段と、この分周手段で生成された基準クロックにより送信キャリアを生成する送信キャリア生成手段と、上記分周手段で生成された基準クロックにより受信キャリアを生成する受信キャリア生成手段と、上記分周手段で生成された基準クロックにより通信ボーレートクロックを生成する通信ボーレート生成手段と、上記制御素子で決定された基準クロック値、送信キャリア周波数、受信キャリア周波数、通信ボーレートクロック値の情報を受信し、この受信した情報に基づいて上記分周手段で生成する基準クロック値を上記分周手段に設定し、上記送信キャリア生成手段で生成する送信キャリア周波数を上記送信キャリア生成手段に設定し、上記受信キャリア生成手段で生成する受信キャリア周波数を上記受信キャリア生成手段に設定し、上記通信ボーレート生成手段で生成する通信ボーレートクロック値を上記通信ボーレート生成手段に設定する設定手段とから構成されている。

【0009】この発明のリーダライタは、基準クロック値、送信キャリア周波数、受信キャリア周波数、通信ボーレートクロック値を決定する制御素子を有したリーダライタにおいて、外部から入力されるクロックを分周して基準クロックを生成する分周手段と、この分周手段で生成された基準クロックを分周して送信キャリアを生成

する送信キャリア生成手段と、上記分周手段で生成された基準クロックを分周して受信キャリアを生成する受信キャリア生成手段と、上記分周手段で生成された基準クロックを分周して通信ボーレートクロックを生成する通信ボーレート生成手段と、上記制御素子で決定された基準クロック値、送信キャリア周波数、受信キャリア周波数、通信ボーレートクロック値のシリアルデータを受信し、この受信したシリアルデータを解読して上記基準クロック値を生成する分周値を上記分周手段に設定し、上記送信キャリア周波数を生成する分周値を上記送信キャリア生成手段に設定し、上記受信キャリア周波数を生成する分周値を上記受信キャリア生成手段に設定し、上記通信ボーレートクロック値を生成する分周値を上記通信ボーレート生成手段に設定する設定手段とから構成されている。

【0010】この発明のリーダライタは、複数の通信条件情報に付与された識別情報を指定して通信条件を決定する制御素子を有したリーダライタにおいて、外部から入力されるクロックを分周して基準クロックを生成する分周手段と、この分周手段で生成された基準クロックにより送信キャリアを生成する送信キャリア生成手段と、上記分周手段で生成された基準クロックにより受信キャリアを生成する受信キャリア生成手段と、上記分周手段で生成された基準クロックにより通信ボーレートクロックを生成する通信ボーレート生成手段と、基準クロック値、送信キャリア周波数、受信キャリア周波数、通信ボーレートクロック値を含む通信条件情報に識別情報が付与された複数の通信条件情報を予め記憶している記憶手段と、上記制御素子で決定された通信条件を指定する識別情報を受信し、この受信した識別情報を用いて上記記憶手段を検索し、検索して呼び出した通信条件情報としての上記分周手段で生成する基準クロック値を上記分周手段に設定し、上記送信キャリア生成手段で生成する送信キャリア周波数を上記送信キャリア生成手段に設定し、上記受信キャリア生成手段で生成する受信キャリア周波数を上記受信キャリア生成手段に設定し、上記通信ボーレート生成手段で生成する通信ボーレートクロック値を上記通信ボーレート生成手段に設定する設定手段とから構成されている。

【0011】この発明のリーダライタは、複数の通信条件情報に付与された識別情報を決定する制御素子を有したリーダライタにおいて、外部から入力されるクロックを分周して基準クロックを生成する分周手段と、この分周手段で生成された基準クロックを分周して送信キャリアを生成する送信キャリア生成手段と、上記分周手段で生成された基準クロックを分周して受信キャリアを生成する受信キャリア生成手段と、上記分周手段で生成された基準クロックを分周して通信ボーレートクロックを生成する通信ボーレート生成手段と、基準クロック値、送信キャリア周波数、受信キャリア周波数、通信ボーレートクロック値を生成する分周値を含む通信条件情報に識別情報が付与された複数の通信条件を予め記憶している記憶手段と、上記制御素子で決定された通信条件を指定する識別情報を受信し、この受信した識別情報を用いて上記記憶手段を検索し、検索して呼び出した通信条件情報としての基準クロック値を生成する分周値を上記分周手段に設定し、送信キャリア周波数を生成する分周値を上記送信キャリア生成手段に設定し、受信キャリア周波数を生成する分周値を上記受信キャリア生成手段に設定し、通信ボーレートクロック値を生成する分周値を上記通信ボーレート生成手段に設定する設定手段とから構成されている。

【0012】この発明のリーダライタは、基準クロック値、送信キャリア周波数、受信キャリア周波数、通信ボーレートクロック値を決定する制御素子を有して、無線カードと無線通信を行うリーダライタにおいて、外部から入力されるクロックを分周して基準クロックを生成する分周手段と、この分周手段で生成された基準クロックにより送信キャリアを生成する送信キャリア生成手段と、上記分周手段で生成された基準クロックにより受信キャリアを生成する受信キャリア生成手段と、上記分周手段で生成された基準クロックにより通信ボーレートクロックを生成する通信ボーレート生成手段と、上記制御素子で決定された基準クロック値、送信キャリア周波数、受信キャリア周波数、通信ボーレートクロック値の情報を受信し、この受信した情報に基づいて上記分周手段で生成する基準クロック値を上記分周手段に設定し、上記送信キャリア生成手段で生成する送信キャリア周波数を上記送信キャリア生成手段に設定し、上記受信キャリア生成手段で生成する受信キャリア周波数を上記受信キャリア生成手段に設定し、上記通信ボーレート生成手段で生成する通信ボーレートクロック値を上記通信ボーレート生成手段に設定する設定手段と、この設定手段で設定された上記送信キャリア生成手段で生成される送信キャリア、上記通信ボーレート生成手段で生成される通信ボーレートクロック、上記制御素子から送信される送信データとから変調データを生成する送信制御手段と、上記設定手段で設定された上記受信キャリア生成手段で生成される受信キャリア、上記通信ボーレート生成手段で生成される通信ボーレートクロック、上記無線カードから受信した受信データとから復調データを生成する受信制御手段と、上記送信制御手段に対して上記送信データに対するデータ加工を制御し、上記受信制御手段に対して上記復調データに対するデータ加工を制御する制御手段とから構成されている。

【0013】この発明のリーダライタの通信条件設定方法は、基準クロック値、送信キャリア周波数、受信キャリア周波数、通信ボーレートクロック値を決定する制御素子を有したリーダライタの通信条件設定方法であって、外部から入力されるクロックを分周して基準クロックを生成するステップと、この基準クロックにより送信キャリアを生成するステップと、上記基準クロックにより受信キャリアを生成するステップと、上記基準クロックにより通信ボーレートクロックを生成するステップと、上記制御素子で決定された基準クロック値、送信キャリア周波数、受信キャリア周波数、通信ボーレートクロック値の情報を受信し、この受信した情報に基づいて上記生成する基準クロック値を設定し、上記生成する送信キャリア周波数を設定し、上記生成する受信キャリア周波数を設定し、上記生成する通信ボーレートクロック値を設定するステップとからなることを特徴とする。

【0014】この発明のリーダライタの通信条件設定方法は、基準クロック値、送信キャリア周波数、受信キャリア周波数、通信ボーレートクロック値を決定する制御素子を有したリーダライタの通信条件設定方法であって、外部から入力されるクロックを分周して基準クロックを生成するステップと、この基準クロックを分周して送信キャリアを生成するステップと、上記基準クロックを分周して受信キャリアを生成するステップと、上記基準クロックを分周して通信ボーレートクロックを生成するステップと、上記制御素子で決定された基準クロック値、送信キャリア周波数、受信キャリア周波数、通信ボーレートクロック値のシリアルデータを受信し、この受信したシリアルデータを解読して上記基準クロック値を生成する分周値を設定し、上記送信キャリア周波数を生成する分周値を設定し、上記受信キャリア周波数を生成する分周値を設定し、上記通信ボーレートクロック値を生成する分周値を設定するステップとからなることを特徴とする。

【0015】この発明のリーダライタの通信条件設定方法は、複数の通信条件情報に付与された識別情報を指定して通信条件を決定する制御素子を有したリーダライタの通信条件設定方法であって、外部から入力されるクロックを分周して基準クロックを生成するステップと、この基準クロックにより送信キャリアを生成するステップと、上記基準クロックにより受信キャリアを生成するステップと、上記基準クロックにより通信ボーレートクロックを生成するステップと、基準クロック値、送信キャリア周波数、受信キャリア周波数、通信ボーレートクロック値を含む通信条件情報に識別情報が付与された複数の通信条件情報を予め記憶するステップと、上記制御素子で決定された通信条件を指定する識別情報を受信し、この受信した識別情報を用いて上記記憶している識別情報を検索して通信条件情報を呼び出し、この通信条件情報に含まれる上記生成する基準クロック値を設定し、上記生成する送信キャリア周波数を設定し、上記生成する受信キャリア周波数を設定し、上記生成する通信ボーレートクロック値を設定するステップとからなることを特徴とする。

【0016】この発明のリーダライタの通信条件設定方法は、複数の通信条件情報に付与された識別情報を決定する制御素子を有したリーダライタの通信条件設定方法であって、外部から入力されるクロックを分周して基準クロックを生成するステップと、この基準クロックを分周して送信キャリアを生成するステップと、上記基準クロックを分周して受信キャリアを生成するステップと、上記基準クロックを分周して通信ボーレートクロックを生成するステップと、基準クロック値、送信キャリア周波数、受信キャリア周波数、通信ボーレートクロック値を生成する分周値を含む通信条件情報に識別情報が付与された複数の通信条件を予め記憶するステップと、上記制御素子で決定された通信条件を指定する識別情報を受信し、この受信した識別情報を用いて上記記憶している識別情報を検索して通信条件情報を呼び出し、この通信条作情報に含まれる基準クロック値を生成する分周値を設定し、送信キャリア周波数を生成する分周値を設定し、受信キャリア周波数を生成する分周値を設定し、通信ボーレートクロック値を生成する分周値を設定するステップとからなることを特徴とする。

【0017】この発明のリーダライタの通信条件設定方法は、基準クロック値、送信キャリア周波数、受信キャリア周波数、通信ボーレートクロック値を決定する制御素子を有して、無線カードと無線通信を行うリーダライタの通信条件設定方法であって、外部から入力されるクロックを分周して基準クロックを生成するステップと、この基準クロックにより送信キャリアを生成するステップと、上記基準クロックにより受信キャリアを生成するステップと、上記基準クロックにより通信ボーレートクロックを生成するステップと、上記制御素子で決定された基準クロック値、送信キャリア周波数、受信キャリア周波数、通信ボーレートクロック値の情報を受信し、この受信した情報に基づいて上記生成する基準クロック値を設定し、上記生成する送信キャリア周波数を設定し、上記生成する受信キャリア周波数を設定し、上記生成する通信ボーレートクロック値を設定するステップと、上記設定された送信キャリア周波数で生成される送信キャリア、上記設定された通信ボーレートクロック値で生成される通信ボーレートクロック、上記制御素子から送信される送信データとから変調データを生成するステップと、上記設定された受信キャリア周波数で生成される受信キャリア、上記通信ボーレートクロック値で生成される通信ボーレートクロック、上記無線カードから受信した受信データとから復調データを生成するステップと、上記送信データに対するデータ加工を制御し、上記復調データに対するデータ加工を制御するステップとからなることを特徴とする。

【0018】

【発明の実施の形態】以下、この発明の一実施の形態について図面を参照して説明する。

【0019】図1は、この発明に係わる無線カード処理

システムの概略構成を示すものである。

【0020】すなわち、無線カード処理システムは、上位装置としてのパーソナルコンピュータ（PC）1と、このPC1に接続されるリーダライタ（R/W）2とこのリーダライタ2のアンテナ部3との間で無線通信を行う無線（IC）カード4、…とにより構成されている。

【0021】PC1は、図示しない制御部、操作部、表示部、リーダライタ2の接続部により構成されている。

【0022】リーダライタ2は、リーダライタ2の全体を制御する制御回路（制御素子）としてのMPU5、インターフェースとしての無線カードリーダライタ用のLSI6、送受信回路7、アンテナ部3、及び入力クロック分周回路21とにより構成されている。

【0023】MPU5は、MPU5の全体を制御するCPU11、制御プログラム、各種情報を記憶し、RAM，ROMからなるメモリ12，LSI6との通信用のシリアルデータのインプット、アウトプット用のS10 13により構成されている。

【0024】CPU11は、上記PC1に接続され、データのやり取りが行われるものであり、たとえばデータリードコマンドの受信に対して、LSI6にデータリードコマンドの送信を行うようになっている。

【0025】上記S1013には、シリアルインプットデータ（SI）用のI/Oポート、シリアルアウトプットデータ（SO）用のI/Oポート、シリアルクロック（SCK）用のI/Oポート、コントロール信号（CONT）用のI/Oポートが設けられている。

【0026】上記S1013は、無線カード4のデータリードコマンドをSI用のI/OポートからしSI6へ出力するものである。

【0027】アンテナ部3は、送信アンテナ14、受信アンテナ15により構成されている。

【0028】上記送受信回路7は、送信回路16、受信回路17により構成されている。

【0029】無線カード4は、全体を制御する制御回路、制御プログラム、乱数、ID（認識番号）データ等の各種情報を記憶するメモリ、変調復調回路、電源発生回路、送受信アンテナにより構成されている。

【0030】図2は、LSI6の概略構成を示すものである。LSI6は、入力クロック分周回路21，MPUI/F22、送信キャリア生成回路23、受信キャリア生成回路24、通信ボーレート生成回路25、送信制御回路（変調回路）26、及び受信制御回路（復調回路）27とから構成されている。

【0031】入力クロック分周回路21は、リーダライタ2に入力される外部クロックを分周し、システムの基準となるクロックを生成するものである。例えば、1/1，1/1．5，1/2，1/4等の分周値を設けることにより、本発明による汎用リーダライタの機能をより汎用性のあるものにすることが出来る。

【0032】MPUI/F回路22は、上記入力クロック分周回路21、送信キャリア生成回路23、受信キャリア生成回路24、通信ボーレート生成回路25の各レジスタの設定をMPU5のシリアル端子を介してソフトウェアにて自動的に行うためのインターフェース（I/F）回路である。MPU5からのシリアルデータを受信・デコードすることにより、上記入力クロック分周回路21、送信キャリア生成回路23、受信キャリア生成回路24、通信ボーレート生成回路25の各レジスタの設定を行う。

【0033】送信キャリア生成回路23は、入力クロック分周回路21で生成された基準クロックより、無線カード4への送信キャリア周波数を設定するためのものである。基準クロックを任意の値に分周することにより実現する。

【0034】受信キャリア生成回路24は、入力クロック分周回路21で生成された基準クロックより、無線カード4からの受信データの受信キャリア周波数を設定するためのものである。基準クロックを任意の値に分周することにより実現する。

【0035】通信ボーレート生成回路25は、入力クロック分周回路21で生成された基準クロックより、無線カード4との通信ボーレートクロック（ボーレートの16倍の周波数）を設定するためのものである。基準クロックを任意の値に分周することにより実現する。

【0036】送信制御回路26は、送信キャリア生成回路23で生成された送信キャリアと、通信ボーレート生成回路25で生成された通信ボーレートクロックと、MPUI/F回路22からの送信データにより、無線カード4への変調データを生成する回路である。

【0037】受信制御回路27は、無線カード4からの受信データと、受信キャリア生成回路24で生成された受信キャリアと、通信ボーレート生成回路25で生成された通信ボーレートクロックにより、MPU5への復調データを生成する回路である。

【0038】次に、このような構成において、リーダライタ2の動作を図3のフローチャートを参照して説明する。

【0039】電源が投入された際（ST1）、MPUI/F回路22は、MPU5との通信プロトコルとしての初期通信モードの判定を行う（ST2）。

【0040】この判定に従ってMPUI/F回路22は、MPU5よりシリアル通信を介して通信条件情報を受信し、受信した通信条件情報をデコードし、このデコードした通信条件に基づいて入力クロック分周回路21の分周値を設定し（ST3）、送信キャリア生成回路23の送信キャリア周波数を設定し（ST4）、受信キャリア生成回路24の受信キャリア周波数を設定し（ST5）、通信ボーレート生成回路25の通信ボーレートを設定する（ST6）。

【0041】そして、MPUI/F回路22は、MPU5よりシリアル通信を介してその他のモードの情報を受信し、その他のモードを設定し（ST7）、全設定を有効にし（ST8）、無線カード4との通信を開始する（ST22）。

【0042】上述したステップST3～6のルーチンにより、無線カード4との通信条件が設定される。ただし、この設定順は問わない。これら設定は、MPU5のシリアルI/Fを用いてMPU5のメモリ12に記憶されているソフトウェアにより電源投入後、自動的に行われる。

【0043】次に、リーダライタ2における具体的に構成した第1実施例を図4を参照して説明する。下記の通信条件で動作する無線カード4との通信を可能とするためのリーダライタ2の設定は次のようになる。

【0044】通信条件
入力クロック周波数：16MHz
送信キャリア周波数：125kHz
受信キャリア周波数：62．5kHz
通信ボーレート：7800bps
MPUI/F回路22は、図3で示したフローにのっとりリーダライタ2の設定を行う。まず、MPU5は、ステップST3～6での各レジスタを設定するに当たり、予めどのような値を設定するかを決める。

【0045】続いて、MPUI/F回路22は、ここで決定した値をMPU5よりシリアル通信を介して受信し、入力クロック分周回路21、送信キャリア生成回路23、受信キャリア生成回路24、通信ボーレート生成回路25の各レジスタに対して設定する。

【0046】ここでの通信条件に対する各レジスタの設定は以下のようになる。

【0047】a．入力クロック分周回路21の入力クロック分周値を1/2に設定し、入力クロック（16MHz）から、リーダライタ2の動作の基本となる基準クロック（8MHz）を生成する。

【0048】b．入力クロック分周回路21で生成された基準クロックに対しての送信キャリア周波数（125kHz）を生成するため、送信キャリア生成回路23の分周値を1/64に設定する。

【0049】c．入力クロック分周回路21で生成された基準クロックに対しての受信キャリア周波数（62．5kHz）を生成するために、受信キャリア生成回路24の分周値を1/128に設定する。

【0050】d．入力クロック分周回路21で生成された基準クロックに対しての通信ボーレート（7800bps）を設定するために、通信ボーレート生成回路25の分周値を1/64に設定する。ここで生成されるクロックは、ボーレートの16倍の周波数である。

【0051】このように設定することにより、上記通信条件を備えた無線カード4との通信が可能となる。ただし、a，b，c，dの設定順は問わない。また、ここで示した各レジスタの設定値（分周値）は一例であり、上記通信条件に対して必ずしもこのように設定しなければならないというわけではない。各レジスタの設定値はシステム設定者が任意に指定できる。

【0052】次に、リーダライタ2における具体的に構成した第2実施例を図5を参照して説明する。図4で示した通信条件に対して、入力クロックを8MHzに変更し、その他の条件は図4に同じである。

【0053】MPUI/F回路22は、図3で示したフローにのっとりリーダライタ2の設定を行う。

【0054】a．入力クロック分周回路21の入力クロック分周値を1/1に設定し、入力クロック（8MHz）から、リーダライタ2の動作の基本となる基準クロック（8MHz）を生成する。なお、b．送信キャリア生成回路23の分周値、c．受信キャリア生成回路24の分周値、d．通信ボーレート生成回路25の分周値に関しては図4と同じである。

【0055】このように設定することにより、上記通信条件を備えた無線カード4との通信が可能となる。ただし、上記a，b，c，dの設定順は問わない。また、ここで示した各レジスタの設定値（分周値）は一例であり、上記通信条件に対して必ずしもこのように設定しなければならないというわけではない。各レジスタの設定値はシステム設定者が任意に指定できる。

【0056】次に、リーダライタ2における具体的に構成した第3実施例を図6を参照して説明する。下記通信条件で動作する無線カード4との通信を可能とするためのリーダライタ2の設定は次のようになる。

【0057】通信条件
入力クロック周波数：13．56MHz
送信キャリア周波数：3．322MHz
受信キャリア周波数：847．5kHz
通信ボーレート：106kbps
MPUI/F回路22は、図3で示したフローにのっとりリーダライタ2の設定を行う。まず、MPU5は、ステップST3～6での各レジスタを設定するに当たり、予めどのような値を設定するかを決める。

【0058】続いて、MPUI/F回路22は、ここで決定した値をMPU5よりシリアル通信を介して受信し、入力クロック分周回路21、送信キャリア生成回路23、受信キャリア生成回路24、通信ボーレート生成回路25の各レジスタに対して設定する。

【0059】ここでの通信条件に対する各レジスタの設定は以下のようになる。

【0060】a．入力クロック分周回路21の入力クロック分周値を1/1に設定し、入力クロック（13．56MHz）から、リーダライタの動作の基本となる基準クロック（13．56MHz）を生成する。

【0061】b．入力クロック分周回路21で生成され

た基準クロックに対しての送信キャリア周波数（3．322MHz）を生成するために、送信キャリア生成回路23の分周値を1／4に設定する。

【0062】c．入力クロック分周回路21で生成された基準クロックに対しての受信キャリア周波数（847．5kHz）を生成するために、受信キャリア生成回路24の分周値を1／16に設定する。

【0063】d．入力クロック分周回路21で生成された基準クロックに対しての通信ボーレート（106kbps）を設定するために、通信ボーレート生成回路25の分周値を1／8に設定する。ここで生成するクロックは、ボーレートの16倍の周波数である。

【0064】このように設定することにより、上記通信条件を備えた無線カード4との通信が可能となる。ただし、a，b，c，dの設定順は問わない。また、ここで示した各レジスタの設定値（分周値）は一例であり、上記通信条件に対して必ずしもこのように設定しなければならないというわけではない。各レジスタの設定値はシステム設定者が任意に指定できる。

【0065】次に、リーダライタ2における構成を応用した第4実施例を図7を参照して説明する。本実施例では、追加機能として通信条件設定データ格納メモリ28を用意する。

【0066】上記に示した通り、ある通信条件の基で動作している無線カード4に対してリーダライタ2を有効とするために、ステップST3～6の各設定レジスタをMPU5より設定する必要がある。それぞれ個別にレジスタをアクセスして設定しているが、これでは何度も処理が発生し煩雑となる。

【0067】そこで、本実施例では、これら設定情報を予め記憶させた通信条件設定データ格納メモリ10を用意し、MPU5はメモリ情報のどれを有効にするかを指定する。MPUI／F回路22は、指定されたメモリ情報より通信条件レジスタを自動的に設定する。

【0068】ここで、本第4実施例の処理動作を図8のフローチャートを参照して説明する。

【0069】電源が投入された際（ST11）、MPUI／F回路22は、MPU5との通信プロトコルとしての初期通信モードの判定を行う（ST12）。

【0070】MPUI／F回路22は、MPU5からのメモリ情報のどれを有効にするかの指定に従って通信条件設定データ格納メモリ28からメモリ情報を呼び出し（ST13），このメモリ情報の内容をデコードし（ST14），このデコードした通信条件設定データに基づいて入力クロック分周回路21の分周値を設定し（ST15），送信キャリア生成回路23の送信キャリア周波数を設定し（ST16），受信キャリア生成回路24の受信キャリア周波数を設定し（ST17），通信ボーレート生成回路25の通信ボーレートを設定する（ST18）。

【0071】そして、MPUI／F回路22は、MPU5よりシリアル通信を介してその他のモードを設定し（ST19），全設定を有効にし（ST20），無線カード4との通信を開始する（ST21）。

【0072】図9は、通信条件設定データ格納メモリ28に格納するメモリ情報の構成例である。例えば、仕様がISO10xxxモードの場合、アドレスが00番地，機能（レジスタ設定値）が入力クロック1／1、送信キャリア1／1、受信キャリア1／16、ボーレート1／32と設定されている。

【0073】このメモリ情報の構成例では，機能仕様ごとに通信条件設定データ格納メモリ28内にレジスタ設定情報を配置しておく。ISO10xxxモードに合致した設定にするとき，MPU5は、通信条件設定データ格納メモリ28の00番地を有効にする事により、リーダライタ2の設定をすることが出来る。

【0074】図10は、通信条件設定データ格納メモリ28に格納するメモリ情報の他の構成例である。例えば、仕様が、入力クロック：16MHz，送信キャリア：125kHz，受信キャリア：62．5kHz，通信ボーレート：7800bpsの場合、アドレスが00番地，機能（レジスタ設定値）が入力クロック1／2、送信キャリア1／64、受信キャリア1／128、ボーレート1／64と設定されている。

【0075】このメモリ情報の構成例では、通信条件ごとに通信条件設定データ格納メモリ28内にレジスタ設定情報を配置しておく。例えば、図4で示した通信条件を通信条件設定データ格納メモリ28の00番地に設定しておくことにより、MPU5より通信条件設定データ格納メモリ10の00番地を有効にすると、リーダライタ2の設定がこの通信条件に合致したものになる。

【0076】次に、第5実施例を図11を参照して説明する。

【0077】本第5実施例における図2との相違点は、送信制御回路31と受信制御回路32である。

【0078】送信制御回路（変調回路）31は、送信キャリア生成回路23で生成された送信キャリアと、通信ボーレート生成回路25で生成された通信ボーレートクロックと、MPUI／F回路22からの送信データとにより、無線カード4への変調データを生成する回路である。また、MPUI／F回路22よりのデータ処理制御信号により、送信データに対してデータ加工の有無を制御できる。

【0079】具体的には、

1）同期キャラクタデータの付加。このとき同期キャラクタのキャラクタ値およびキャラクタ長は別途MPU5より任意に指定できる。

【0080】2）CRC演算データの付加。

【0081】3）フレーム開始キャラクタ／フレーム終了キャラクタの付加。フレーム開始／終了キャラクタの

付加は個別に指定できる。

【0082】の機能を搭する。

【0083】受信制御回路（復調回路）32は、無線カード4からの受信データと、受信キャリア生成回路24で生成された受信キャリアと、通信ボーレート生成回路25で生成された通信ボーレートクロックにより、MPU5への復調データを生成する回路である。また、MPUI／F回路22よりのデータ処理制御信号により、復調データに対してデータの加工の有無を制御できる。

【0084】具体的には、

1）同期キャラクタデータの削除。このとき同期キャラクタのキャラクタ値およびキャラクタ長は別途MPU5より任意に指定できる。

【0085】2）CRC演算確認機能（エラー検出機能）。

【0086】3）フレーム開始キャラクタ／フレーム終了キャラクタの削除。フレーム開始／終了キャラクタの削除は個別に指定できる。

【0087】の機能を搭する。

【0088】図12は、送信制御回路31におけるデータ処理制御信号による送信データ加工の具体例である。図12の（a）に示す基データとは、MPU5から送信されるシリアルデータであり、無線カード4に送信すべき本データである。以下、この基データに対するデータの加工を6種の具体例を示して説明する。ここで示されるものはあくまでも具体例であり、実現できる組み合わせをすべて示したものではない。

【0089】（b）は、同期キャラクタを1バイト付加する場合の送信データの状態を示す。基データの先頭に対して、同期キャラクタを付加している。例えば、92Hのキャラクタを付加する。

【0090】（c）は、同期キャラクタを2バイト付加する場合の送信データの状態を示す。基データの先頭に対して、同期キャラクタを付加している。例えば、9292Hのキャラクタを付加する。

【0091】（d）は、CRC演算を付加する場合の送信データの状態を示す。基データに対してCRC演算を実行し、その演算結果を本データの最終データ送信後に付加している。例えば、CRC16の演算をする場合は、16ビットに演算結果が付加される。

【0092】（e）は、基データの前後にそれぞれ開始フレーム（SOF）／終了フレーム（EOF）を付加する場合の送信データの状態を示す。例えば、SOFとして10から11ビットの”Lowレベル”と2から3ビットの”Highレベル”を付加することが出来る。また、EOFとして10から11ビットの”Lowレベル”を付加することが出来る。

【0093】（f）は、基データの前部に開始フレーム（SOF）を付加する場合の送信データの状態を示す。

【0094】（g）は、基データの後部に終了フレーム（EOF）を付加する場合の送信データの状態を示す。

【0095】受信制御回路32におけるデータ処理制御信号による復調データの加工は、図12の（b）～（g）に示す送信データ加工の逆を行う。例えば、先頭に同期キャラクタの付加された復調データから同期キャラクタのみを削除した復調データを生成し、MPU5に対してシリアルデータとして送信する（図12の（b）のデータから基データを生成する）。

【0096】以上説明したように上記発明の実施の形態によれば、様々な通信条件（入力クロック周波数、受信キャリア周波数、送信キャリア周波数、送受信通信ボーレート）を持つ無線カードに対応した汎用リーダライタを実現することが出来る。

【0097】また、リーダライタを汎用化することにより、それぞれの無線カードに対応したリーダライタシステムを個別に製作する必要が無くなり、開発効率、メンテナンスの効率が向上する。

【0098】また、機能設定レジスタをMPUのシリアルI／Fを介して行うことが出来、特別難しい機能を付加することなしに実現しているため、MPUの基本的な操作方法を知るだけで容易に使いこなせることが出来る。

【0099】なお、送受信データの加工制御に関する各設定コマンドについてもメモリ内に情報を格納しておくことによりMPUより自動的に設定することが可能となる。

【0100】

【発明の効果】以上詳述したようにこの発明によれば、さまざまな通信条件に対応する汎用性を持たせ、開発効率およびメンテナンスの効率を向上させることのできるリーダライタとリーダライタの通信条件設定方法を提供することができる。

【図面の簡単な説明】

【図1】この発明に係わる無線カード処理システムの概略構成を示す構成図。

【図2】リーダライタの概略構成を示すブロック図。

【図3】リーダライタの動作を説明するためのフローチャート。

【図4】リーダライタにおける具体的な第1実施例の構成を示す図。

【図5】リーダライタにおける具体的な第2実施例の構成を示す図。

【図6】リーダライタにおける具体的な第3実施例の構成を示す図。

【図7】リーダライタにおける構成を応用した第4実施例を示す図。

【図8】リーダライタの処理動作を説明するためのフローチャート。

【図9】通信条件設定データ格納メモリに格納するメモリ情報の構成例を示す図。

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【図１０】通信条件設定データ格納メモリに格納するメモリ情報の構成例を示す図。

【図１１】リーダライタの第５実施例の構成を示す図。

【図１２】送信制御回路におけるデータ処理制御信号による送信データ加工例を示す図。

【符号の説明】

１…上位装置（ＰＣ）

２…リーダライタ

４…無線カード

５…ＭＰＵ（制御素子）

６…無線カードリーダライタ用ＬＳＩ

＊７…送受信回路

２１…入力クロック分周回路（分周手段）

２２…ＭＰＵＩ／Ｆ（設定手段）

２３…送信キャリア生成回路（送信キャリア生成手段）

２４…受信キャリア生成回路（受信キャリア生成手段）

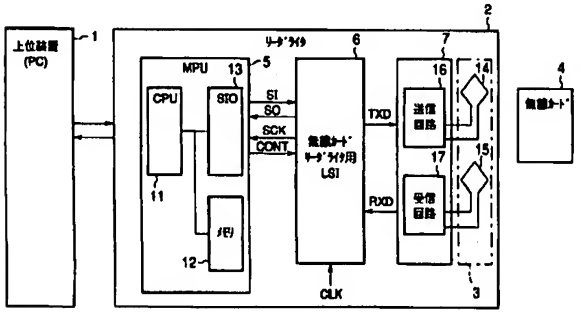
２５…通信ボーレート生成回路（通信ボーレート生成手段）

２６、３１…送信制御回路（送信制御手段）

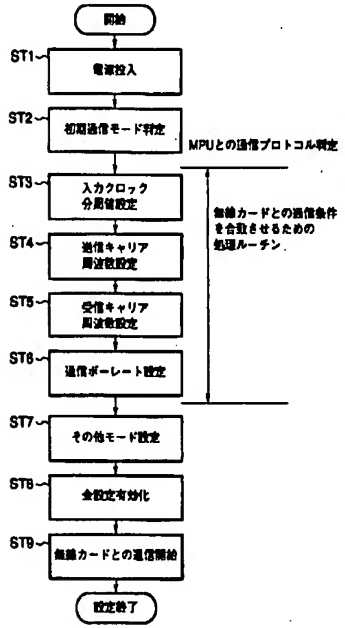
２７、３２…受信制御回路（受信制御手段）

２８…通信条件設定データ格納メモリ（記憶手段）

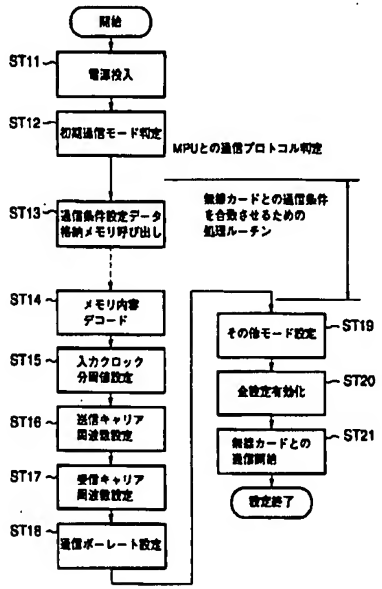
【図１】



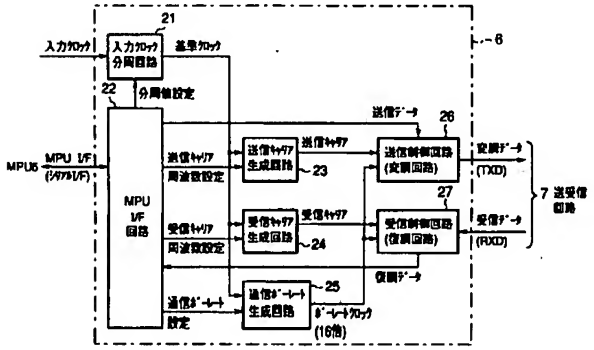
【図３】



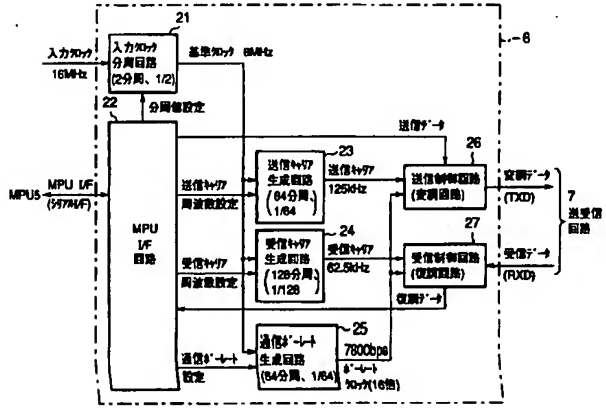
【図８】



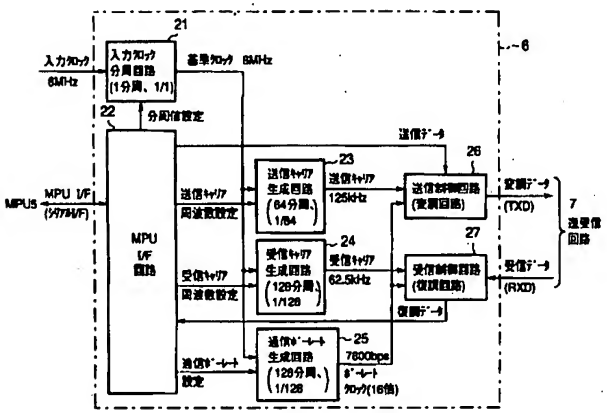
【図２】



【図４】



【図5】



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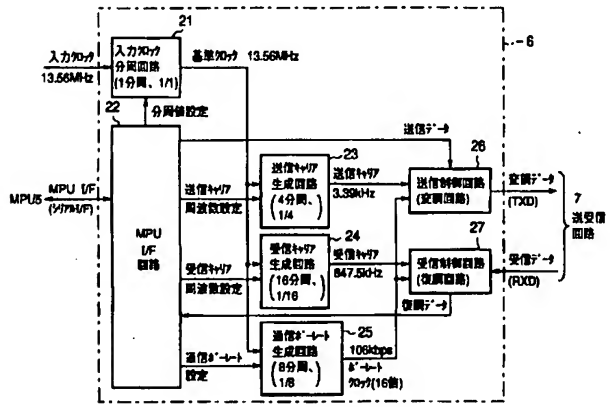

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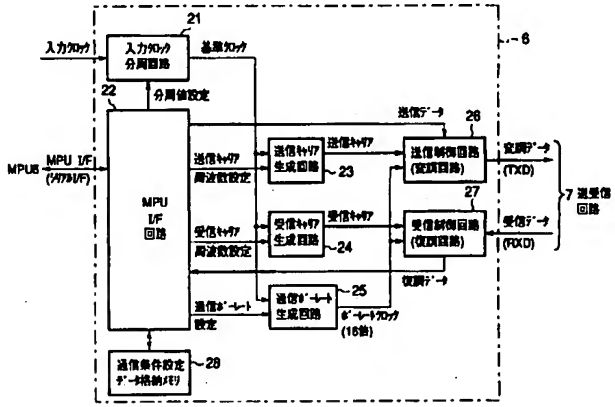


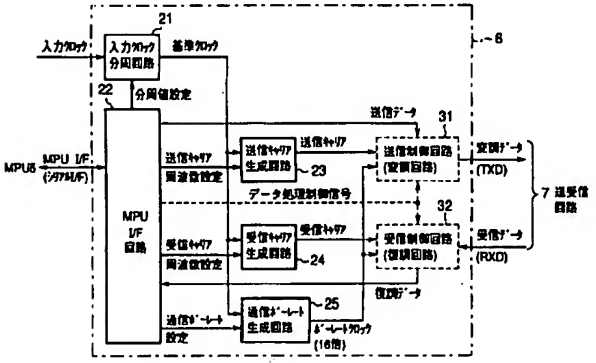
【図9】

仕様	アドレス	機能(レジスタ設定値)
ISO 10xxx モード	00	入力クロック 1/1 送信キャリア 1/1 受信キャリア 1/16 ボーレート 1/32
ISO 14xxx モード	01	入力クロック 1/1 送信キャリア 1/4 受信キャリア 1/16 ボーレート 1/8
A社向け モード1	02	入力クロック 1/2 送信キャリア 1/64 受信キャリア 1/128 ボーレート 1/64
A社向け モード2	03	入力クロック 1/1 送信キャリア 1/64 受信キャリア 1/128 ボーレート 1/64
B社向け モード	04	入力クロック 1/4 送信キャリア 1/8 受信キャリア 1/32 ボーレート 1/16
⋮	⋮	⋮

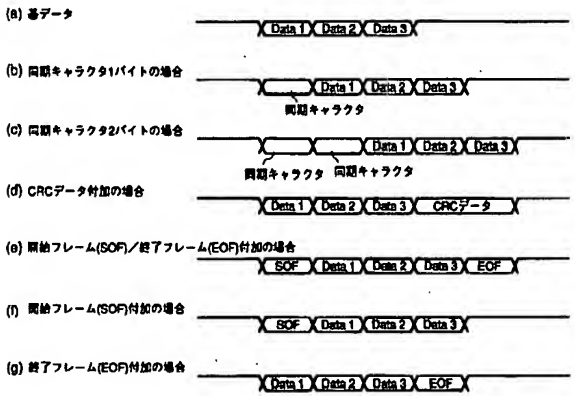
【図10】

仕様	アドレス	機能(レジスタ設定値)
入力クロック :16MHz 送信キャリア :125kHz 受信キャリア :62.5kHz 通信ボーレート:7800bps	00	入力クロック 1/1 送信キャリア 1/64 受信キャリア 1/128 ボーレート 1/64
入力クロック :8MHz 送信キャリア :125kHz 受信キャリア :62.5kHz 通信ボーレート:7800bps	01	入力クロック 1/1 送信キャリア 1/64 受信キャリア 1/128 ボーレート 1/64
入力クロック :13.56MHz 送信キャリア :3.39MHz 受信キャリア :847.5kHz 通信ボーレート:106kbps	11	入力クロック 1/1 送信キャリア 1/4 受信キャリア 1/16 ボーレート 1/8
⋮	⋮	⋮

【図１１】



【図１２】



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(51)Int.Cl.'	識別記号	F I	ﾃｰﾏｺｰﾄﾞ(参考)
H04L 27/00		H04L 27/00	Z

Fターム(参考) 5B014 EB01 GD05 GD33
5B058 CA15 CA22 KA40
5K004 AA01 BA02 BD02
5K034 AA19 AA20 DD01 EE03 FF01
GG02 HH01 HH02 HH04 HH63
KK02 MM08